

LIGHTNING LAP 2015! THIS YEAR'S HOTTEST PERFORMANCE MACHINES HIT THE RACETRACK

CAR DRIVER[®]

OCTOBER 2015

INTELLIGENCE. INDEPENDENCE. IRREVERENCE.

GIANT SLAYER!

CORVETTE Z06 KILLS SUPERCARS DEAD

**HOW THE CHEVY
BEAT THE McLAREN**

Full Corner-by-Corner
Analysis of the
Battle at Virginia
International Raceway.
page 44

ON THIS YEAR'S LL ROSTER:

ALFA
ROMEO 4C
AUDI S3
CADILLAC
CTS-V
FORD
MUSTANG GT
MAZDA MIATA
MERCEDES-
AMG GT S
PORSCHÉ
911 GT3



↖
**IRREFUTABLE
PROOF THAT
GM WAS WORTH
SAVING.**

THE TALE OF THE ALL-NEW 2016 VOLT

AS TOLD FROM AN ENGINEERING AND DESIGN PERSPECTIVE.

We sat down with Executive Chief Engineer Pamela Fletcher and Executive Director of Global Design John Cafaro to talk about the engineering and design innovation that went into creating the revolutionary next-generation Volt.



*Preproduction model shown. Actual production model may vary.
Available Fall 2015.*



*Preproduction model shown. Actual production model may vary.
Available Fall 2015.*



*Preproduction model shown. Actual production model may vary.
Available Fall 2015.*



*Preproduction model shown.
Actual production model may vary.
Available Fall 2015.*



PAMELA FLETCHER

CHEVROLET EXECUTIVE CHIEF ENGINEER
ELECTRIFIED VEHICLES

What are some of the technological breakthroughs in the all-new Volt?

Customers tell us they love range, so we wanted to give them more range. We've fine-tuned the aerodynamics and drag coefficient, resulting in up to 53 miles of pure electric range,¹ nearly 40 percent more than the current-generation Volt. The all-new Voltec propulsion system optimizes two new motors for prime power delivery, while increasing efficiency. Volt offers 420 miles of total range,¹ without having to stop and plug in. The improvement in fuel economy and EV range will save time otherwise spent at the pump as owners can expect over 1,000 miles between fill-ups by charging regularly,¹ providing a more convenient driving experience for our customers.

What are the other differences between the first- and second-generation Volt?

The first-generation Volt was a breakthrough vehicle, and the second-generation Volt takes that idea even further. Volt is the no-compromise electric vehicle with a gas-powered generator on board to take you hundreds more miles beyond its battery range. We worked around every system of the car to make it more efficient and the new vehicle is over 230 pounds lighter than its predecessor. We also have an all-new battery cell that delivers 20 percent more energy by volume.² It's more energy dense but weighs 21 pounds less than the Gen I Volt with a lot more capacity.

*“Customers tell us they love range,
so we wanted to give them more range.”*

Pamela Fletcher

CHEVROLET EXECUTIVE CHIEF ENGINEER, ELECTRIFIED VEHICLES



JOHN CAFARO

CHEVROLET EXECUTIVE DIRECTOR
GLOBAL DESIGN

How did you approach exterior design for the all-new Volt?

When we started putting pencil to paper on the all-new Volt, we wanted something exciting-looking. We knew it was going to have four doors, but we really wanted something sleek with a coupe aesthetic. The biggest change from Gen I to Gen II from an exterior standpoint is that the car's just got a lot more attitude. We spent 340 hours in the wind tunnel, validating and tuning the exterior surface like you might tune a guitar, dialing in the notes just perfectly so they sound right. There is this hint of something beautiful and functional about the car's new shape. We made the all-new Volt more dynamic and more gestured. It's eco with an attitude.

What interior enhancements have you designed into the vehicle?

We added seating for five, which was important to our customers. Additionally, we added richer materials throughout the interior so it's more sculpted, swept and has a lot more movement. In the center stack, we made the controls more intuitive and added a new interface. Apple CarPlay³ is an iPhone® integration technology that allows you to conveniently access compatible apps on the Chevrolet MyLink touch-screen.⁴ Chevrolet design has evolved through the years and we're looking at things totally differently. We're taking some risks along the way, but that's what makes life exciting.



¹ EPA-estimated 53-mile EV range based on 106 MPGe combined city/highway (electric) and 42 MPG combined city/highway (gas). Actual range varies with conditions. ² Comparison to the initial 2011 Volt battery cell.

³ Vehicle user interface is a product of Apple and Apple's terms and privacy statements apply. Requires compatible smartphone and data plan rates apply. iPhone is a trademark of Apple Inc., registered in the U.S. and other countries. ⁴ Full functionality requires compatible Bluetooth and smartphone, and USB connectivity for some devices.

**Introducing a breakthrough in protection
against gunk, wear and corrosion.**

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Shell
V-POWER
NITRO+
Premium Gasoline



**The BEST TOTAL engine
protection you can get.**

Reinventing the premium gasoline category.

While you may think all gasolines are the same, the technology inside Shell V-Power® NiTRO+ Premium Gasoline proves otherwise. Its new additive package with patented technology provides the BEST TOTAL engine protection you can get. That means it protects against not one, but three types of engine performance deterioration - gunk, corrosion and wear. And it's been proven in a variety of industry standard tests.

Unsurpassed protection against gunk.

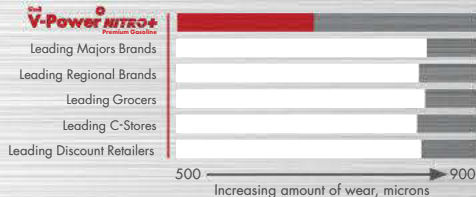


Unbeatable protection against corrosion.



Superior protection against engine wear.

(Results from an Industry Standard Test)



1. Intake valve deposit results based on ASTM D6201.
2. Corrosion results obtained using ASTM D7548/D665.
3. Wear results obtained using gasoline-modified HFRR ASTM D6079.

Technology and engineering meet passion and performance.

BMW M recommends Shell V-Power® NiTRO+ Premium Gasoline

Today two of the world's most innovative brands have joined forces. It's a relationship born of the passion to bring you the very best performance and engine protection on the road. Get the full story at www.shell.us/vpower





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TUDOR
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ON THE COVER

In Opposite World of Lightning Lap, green means "yield" and yellow means "go."

photography by
Marc Urbano

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LAPAROSCOPY

LIGHTNING LAP

2015's hottest performers meet their nemesis: Virginia International Raceway.

by K.C. Colwell,
Tony Quiroga,
Aaron Robinson,
and Eric Tingwall



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CHEVROLET VOLT

The gas-electric Volt, now quicker and less eccentric, is the embodiment of New Age versatility.

by Aaron Robinson

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To the 43rd annual Van Nationals, where we discover what it takes to be a true 2-percenter.

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Ford Transit, Mercedes-Benz Sprinter, Ram ProMaster.

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SECOND DRIVE

AUDI R8

The new R8 looks like a duplicate of the old car, but it's actually a Lamborghini Huracán loaded with different software.

by Mike Duff

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TECH FEATURE

WHAT'S THE DIFF?

Can a couple of clutches and a pair of planetary gears transform a car's handling? We put the torque-vectoring differential to the test.

by Eric Tingwall



THE FORCE OF MURDER



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FUTURE MUSCLE



SMARTER, STRONGER, FASTER. THE NEW 2015 CHARGER.

BORN  **DODGE**

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caranddriver.com

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DON'T MISS NEXT MONTH'S
McLAREN P1 DRIVE ON ISLE OF MAN!
ON SALE OCTOBER 6

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THE
ORIGINAL
DESERT
BOOT



See the world's biggest footprint at www.clarksusa.com/desert-boot

this month on

caranddriver.com

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MATTERS OF IMPORTANCE

THE NEXT BREAKTHROUGH MATERIAL IS 20 TIMES STRONGER THAN CARBON FIBER

Carbon-fiber composites have begun to move from the world of motorsports to that of production cars. But there's an even more exotic material on the horizon that will set new standards for strength, stiffness, and weight. That material is carbon nanotubes. The carbon nanotube's unique structure makes it the strongest, stiffest material known to man.



ENERGY

HOW INDUCTION WILL RECHARGE EVs ON THE FLY

Forget plugging in. Wireless induction charging is already supplying energy to EVs as they drive.



LIFE-CHANGING LUXURY: TECHNOLOGY

CAR AND DRIVER



THE LINCOLN MOTOR COMPANY

BEYOND THE REARVIEW CAMERA: An Enhanced View All the Way Around

The rearview camera is now widely available, but the 2016 Lincoln MKX goes a few steps further, providing a 360-degree "bird's-eye" view over and around the vehicle. Created from four available cameras—mounted on the front, at the rear, and under each sideview mirror of the Lincoln MKX—the four separate feeds are stitched together using advanced software into a single, seamless image that can be viewed on the center console.

The front camera is hidden behind the Lincoln MKX's badge. This forward-facing lens is there when it's needed, but tucked safely away (and protected from the elements) when it's not. This virtual set of eyes makes it easy to nose the car out from between two buildings (or even really large vehicles) and "see" what's coming on both sides. Whether you're parking in a tight spot, maneuvering around hard-to-see obstacles, or navigating a narrow driveway, the full-surround cameras provide the perspective you need—in either a bird's-eye or split-screen view. —ZACH HONIG

THIS AND ALL THE TECH DEVELOPMENTS ON THIS PAGE CONTINUED AT CARANDDRIVER.COM/LIFE-CHANGING-LUXURY



Zach Honig is essentially a professional world traveler (as editor-in-chief of an industry-leading travel site) as well as a veteran tech journalist. He knows cameras inside and out—from years of writing about them and as an avid photographer.



TALKING POINTS

THE FUTURE OF CAR-TO-CAR COMMUNICATIONS

What is car-to-car communications, and why you might—or might not—want it in your next vehicle.



ROBOTS

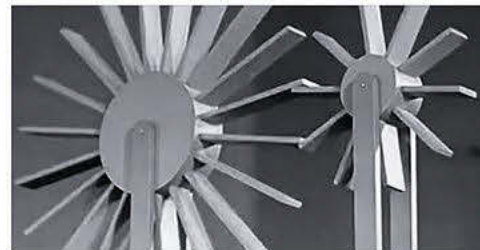
HURDLES ON THE ROAD TO AUTOMATED DRIVING

These are the challenges that need to be overcome before we can let the computers take the wheel.

CONNECTING — Follow along with the latest innovations, car news, and drives and tests on *Car and Driver's* Facebook page ([Facebook.com/CarandDriver](https://www.facebook.com/CarandDriver)).



Even if you already understand how a manual transmission works, this vintage film from 1936 explains it so well, a grade schooler could comprehend it.



This 1936 Film Perfectly Explains How a Manual Transmission Works

Along with the actual wheels, the manual transmission is among the least-evolved components of a modern car. A brand-new 2015 model's stick shift has a whole...

BLOG.CARANDDRIVER.COM

Enough about us. Let's talk about you for a minute.

There is the relaxed you (hopefully we'll be seeing that you a little more often).

There is the sporty you (the you who can dodge and weave and go go go). And then there is the intelligent, dependable, everyday you. This is the one who knows that all of you need their vehicle to be versatile, responsive and smart enough to adapt to whichever one of you is behind the wheel. Three driving modes that, all together, deliver the feeling of control, comfort and — wait for it — connection. It's just one (well, three actually) of the impressive innovations you'll find on the entirely new Lincoln MKX. *LincolnMKX.com/Driving*

THE FEELING STAYS WITH YOU.

Available features shown. Wheels available fall 2015.



THE ENTIRELY NEW
LINCOLN MKX



MICHELIN ENGINEER

**CORVETTE DRIVER
TOMMY MILNER**



TWO CULTURES OF INNOVATION, A DECADE OF ADRENALINE-DRIVEN SUCCESS.

"IN MY EXPERIENCE, NOBODY HAS EVER HAD A TIRE THAT IS AS FAST AND LASTS AS LONG AS MICHELIN. YOU ASK ANY DRIVER IN THE PADDOCK AND THEY'LL ALL SAY THE EXACT SAME THING."

— Tommy Milner

Thousands of laps. Hundreds of hours of direct driver feedback. Twelve years into the Michelin-Corvette Racing relationship, the bond between tire and car, driver and engineer, has never been stronger. This partnership has allowed Corvette drivers to claim victory over 70 times in major races in North America and at the fabled 24 Hours of Le Mans. The forecast for the future? Continued elevation of performance and pulse rates.



What we learn on the track we bring to the street — in the form of advances in braking, grip, handling, and endurance in good weather and bad — to fulfill the Michelin commitment to Total Performance. To learn more, go to michelinman.com



PROUD PARTNER



backfires

□ hosted by E.D.

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Sic your dogs on us at:
editors@caranddriver.com
or join the discussion at:
backfires.caranddriver.com



TIME STAMP

The stopwatch on the July cover is awesome! Who thought of that? That person deserves a raise.

NEIL LOCKWOOD

HUNTERVILLE, NORTH CAROLINA

Imagine my horror when I saw a stopwatch on the cover of your latest issue. Perhaps you should change the title of your magazine to *Chronograph and Timekeeper*. What next, a Ford F-150 Raptor on the cover?

MIKE MEYERS

GRAND RAPIDS, MICHIGAN

Imagine my horror when I paid to see The Love Guru, Meyers—Ed.

DIAMONDS ARE A READER'S BEST FRIEND

I just finished the 60th Anniversary issue [July 2015] and really enjoyed it. Please publish another 60th Anniversary edition next year, and each year thereafter.

DAVID KETTLEHAKE

LEBANON, OHIO

Glorious! I loved every page of this issue, and that's the first time I've been able to say that. One terrible and traumatic problem with this issue: It had an end.

MIKE ST. DENIS

SOUTHAMPTON, PENNSYLVANIA

I've been a subscriber since the early '70s, having been captured when your corporate overlords put the Borg [Griffith Borgeson] on *Car Life*. The anniversary issue brought back memories of a lot of iron from my youth, but how could you, in the name of all that's righteous in journalism, omit P.J.

O'Rourke's description of the Porsche 911 as an "ass-engined Nazi slot car?" Leaving out the best line to grace your pages in 60 years? Unconscionable, say I!

THE HIGHLY OFFENDED THOMAS KING

VICTOR, NEW YORK

Well, you did it for us, King—Ed.

Simply the best magazine I have ever read. Period.

RON CLARK

TORONTO, ONTARIO

Congrats on 60 entertaining years. I was, however, dismayed to learn that you have, er, fudged or even fabricated road tests. And worse, it seems that you print letters from bogus people and places. I mean, who does that?

SNATCH RENTLOW

CADILLAC RANCH, TEXAS

I have been a loyal subscriber since about 1970 and have never been driven to write to you until now. Usually,

special-anniversary editions of cars and magazines are pretty lame. But the anniversary issue is the best issue ever. I loved the old-versus-new-car comparisons, all of the columnists' articles, the old Backfires letters; in short, I loved every single (non-advertisement) page. And in all the years of reading *C/D*, that is something I could never have said in the past. I suppose that asking for a special 60-years-and-a-month issue is unrealistic, so good luck for the next 60 years, but please don't make me wait another 60 years to compliment you again.

BILL BAUMAN

LA CROSSE, WISCONSIN

Oh, well. Until I read the fine print, I thought the vial on the July issue's cover was the congealed blood of your sainted test drivers and it only liquefied when a new Chevy Corvette or Ferrari was announced!

GENE SCANLAN

SECHLT, BRITISH COLUMBIA

I'm only running this letter because it is so strange—Ed.

As we are both in our 60s, can I add Incontinence to Intelligence, Independence, Irreverence?

NICK CORNWELL

CAMPBELLVILLE, ONTARIO

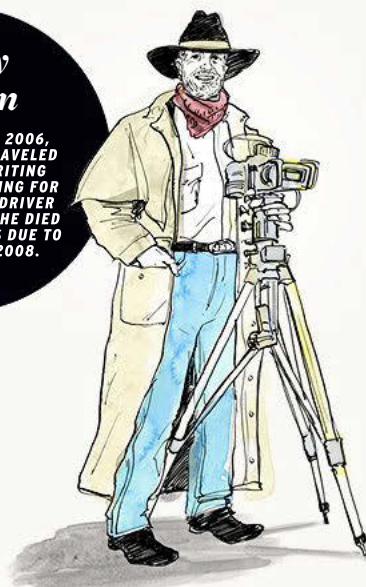
I may have to cancel my subscription. There is no way you can top this issue. But I will reserve my final decision until Zero to Seventy comes out. What a wonderful journey through my past and yours. Thank you, and keep on doing it the intelligent, independent, and irreverent way.

JOSEPH R. DULLER

OAK RIDGE, NORTH CAROLINA

Larry Griffin

FROM 1978 UNTIL 2006, LARRY GRIFFIN TRAVELED THE COUNTRY WRITING AND PHOTOGRAPHING FOR C/D. A TALENTED DRIVER AND KEEN CRITIC, HE DIED OF COMPLICATIONS DUE TO PNEUMONIA IN 2008.



One point: Sending C/D out sans plastic wrapper, allowing the post-office folk an opportunity to mangle it up sufficiently, was not very smart, was it? Look, not that I'll be around for 120 years, or even 100, but if by some wild chance the post office happens to still be in business, do your subscribers a favor and wrap the damn thing up inside some kind of safety glove before dropping it off in the mailbox.

MICHAEL PRESLEY
ORLANDO, FLORIDA

As an eight-year-old in 1955, I was already addicted to the world of cars. My grandfather was one of the first Ford factory-trained mechanics in dealerships, and my father and uncle, both World War II vets, continually populated our driveways with an ever-changing parade of new American and European products throughout the '50s and '60s. Through them, my car-nut gene was already active well before I could spell puberty. And then...wham!...*SCI/Car and Driver* hit the newsstands and further cemented my love of wheeled vehicles for a lifetime of enjoyment.

Your breakouts and template for the Zero to Sixty issue allowed me to literally relive my early years through print, pictures, and memory-jogging tidbits otherwise lost in the ever-changing techno-driven world we live in today. Simply stated, you moved me. Well done, *Car and Driver*. Very well done.

JOHN HAZELTON
CHESTERFIELD, VIRGINIA

Wow. Thank you for the Zero to Sixty issue. Took me a while to catch on to the

reference; thought it was another performance-junkie issue. Was wrong, so wrong. Someone—maybe more than one in your midst—may be in love with cars. Every photo, every word reinforces that idea. Give a raise to whoever had the idea of comparing one model from the '50s through the 2000s to a contemporary equivalent. Brilliant. Meanwhile, in France... Knock me over with a feather; you guys tickle me. Please, don't ever lose that sense of humor in your automotive erudition: It truly makes your mag stand out in a sea of soulless hacks.

TIM FAULKNER
ITHACA, NEW YORK

I rarely do this, but I am writing you to say a hearty "well done" on the 60th Anniversary issue I just read. Brought back a lot of memories of cars I thought were fantastic—and the reality of what the industry is doing today. No one has done such a thoughtful set of decade pieces. Great job, I loved every page.

MARK REUSS
EXECUTIVE VICE PRESIDENT,
GLOBAL PRODUCT DEVELOPMENT,
PURCHASING AND SUPPLY CHAIN,
GENERAL MOTORS COMPANY
DETROIT, MICHIGAN

"Zero to Sixty"—very clever. No way you guys thought of that on your own.

JEFF DISANDRO
MILTON, MASSACHUSETTS

MYTHOLOGICAL GRIFFIN

As an avid C/D reader for the good part of the last 38 years, I can honestly say it is the best darn auto magazine out there! I just received the 60th Anniversary edition, and once again it is an amazing piece of automotive journalism. I must, however, disagree with an item on the "What I'd Do Differently" page. In my humble opinion, the best writer during the past 38 years is the late, great Larry Griffin. God rest his soul! When he was writing, I would always flip through the magazine and read his columns first.

MARTIN D. SEGEL, Ph.D.
BOCA RATON, FLORIDA

Your 60th Anniversary issue was the best car mag I have ever read. I eagerly await the next one in the year 2075.

RYAN TOLONE
COLUMBUS, OHIO

I noticed that there were congratulatory ads from several foreign automakers in the 60th Anniversary issue, but General Motors didn't do one. Did Roger Smith at least send pudding?

RICH FOLEY
FAYETTE, OHIO

Great job with your 60th Anniversary issue. It sure brings back memories, like the GM X-car and Renault Alliance I bought after reading your reviews.

BILL HETTINGER
WINDHAM, CONNECTICUT

You're welcome—Ed.

I read every word from the cover straight to the last page. Well, not straight, I used TP to bookmark where I left off. If I had read it straight through in one sitting, my wife would have started questioning what I was really doing in there.

DENNIS KELLY
QUEENS, NEW YORK

Sixty years and no swimsuit issue? I think a buxom blond babe in a bikini blanketing the back end of a Benz would do wonders for your circulation. And mine.

TOMMY TUCKER
BLOOMFIELD HILLS, MICHIGAN



SUGAR RAY

Signature

SKECHERS
SPORT
WITH **MEMORY FOAM**



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. backfires

Upon reading your commemorative 60th Anniversary issue, I could not help but notice a deterioration in one area, despite relative progress overall. There has been an unfortunate dearth of pornography in this publication for several years.

ETHAN IVY
MONETTE, ARKANSAS

A Happy 60th Seconds [*sic*], that's what it takes to read this waste of good paper, in 60 seconds while sitting on the royal bowl.

Serious [*sic*], your magazine really sucks. The only reason I look at it that someone always gives it to me after he reads it in 120 seconds (cause he is a moron for still buying this crap).

Your pick of worthless foreign junk always makes it in your crappy mag. Most of your staff don't [*sic*] know diddle about cars or trucks. They get in it and drive something, they don't know their ass from their elbow. Worthless information. The only good thing about *Crap & Dumper* is that it is good toilet paper. Thanks for nothing.

BRIAN KAPPES [*sic*]
CARTERET, NEW JERSEY

UPPER DECKERS

There was one letter whose omission I greatly regret [Backfires, July 2015]. It was from the early '80s, written by a gentleman from New Mexico. His letter went something like this: "Regarding your recent test of the Ford Escort EXP Turbo, I have the following comment: You can put a candle in a cow patty, but that doesn't make it a birthday cake." I have used that line many times in many situations ever since! Congratulations on the issue.

ED TINSLEY
AUSTIN, TEXAS

I was surprised and honored to see my name as the person who has had the most letters get by Ed's editorial filters. But in

your rush to put out that fine 60th Anniversary issue, you neglected to mention how many years my subscription gets renewed as a result of that honor.

BERNIE SPENCER
FORT THOMAS, KENTUCKY
That's the last one, Spencer—Ed.

So, I had been constipated, right? [*Now that's how to start a letter—Ed.*] I started reading Backfires on the pot. When I got

to the flaming RX-7 letter, your response with "Did it won?" made me laugh so hard that I am no longer constipated. Thank you so much, you're the best.

ANDREW BAPTISTA
MERCED, CALIFORNIA

What did this Brock Yates person do to piss off so many people?

ISAAC LOCKERT
OTTAWA, ONTARIO

Everything—Ed.

Could you please publish your 120th Anniversary issue early? I can't wait to read the next 60 years' worth of letters and Ed's comments.

SCOTT ERICKSON
ALTA LOMA, CALIFORNIA

CAR AND DRIVER

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I finally finished the last line in your "Zero to Sixty" issue. Very nice trip down memory lane, and the old-versus-new-model comparisons were especially enjoyable. Hell, the historical look back at the readers' letters in Backfires alone took me through several "sittings."

LES NUNES
FROM HIS THRONE IN NORCAL

APPENDIXITIS

Meanwhile, in France... I'm still laughing! Great stuff! I think I'm going to have to subscribe now!

EARLE HOLT
CAMDEN, MAINE

The No. 1 reason for loving the 60th Anniversary issue: Meanwhile, in France.
JOHN OGLESBY
MIRAMAR BEACH, FLORIDA

Meanwhile, in France—and the issue in general—hilarious!

ROBERT LAVEYRA
PRINCETOWN, NEW YORK

I would love to know why the anniversary issue informed me of France's automotive whereabouts in each decade. You got a giggle or two from me at the column's absurdity and persistence.

TY FARKAS
SANTA ROSA, CALIFORNIA
Take French philosopher Albert Camus's advice and embrace the absurd—Ed.



Innovation
that excites

THE NEW NISSAN TITAN[®] XD.

HAULS MORE CLASS THAN IT SHOULD.

We dropped a Cummins[®] 5.0L V8 Turbo Diesel¹ into the 2016 TITAN XD. Boosted by a Holset[™] M² two-stage turbocharger, this beast makes over 310 hp and 555 lb-ft of torque, giving you smooth, efficient towing for more than six tons.² That's heavy-duty attitude in a full-size pickup – the first in a lineup of all-new trucks from Nissan.³



AMERICAN TITAN

DESIGNED IN **CALIFORNIA** ENGINEERED IN **MICHIGAN**
TESTED IN **ARIZONA** ASSEMBLED IN **MISSISSIPPI**
POWERED BY **INDIANA** AND **TENNESSEE**

¹Available engine. ²Estimated towing capacity on select trims based on Nissan internal testing. ³The 2016 Nissan TITAN is not yet available for purchase. Expected availability in December 2015. Pre-production model shown; see actual production vehicle when available for final details on features. See *Nissan Towing Guide* and Owner's Manual for proper use. Cargo and load capacity limited by weight and distribution. Always secure all cargo. Heavy loading of the vehicle with cargo, especially on the roof, will affect the handling and stability of the vehicle. Always wear your seat belt, and please don't drink and drive. ©2015 Nissan North America, Inc.

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. backfires

Potshots at French cars invite a riposte. A retrospective in a French magazine with “Meanwhile, in the USA...” would be spoiled for choice:

’50s: Ford Edsel
’60s: International Harvester Scout
’70s: AMC Gremlin
’80s: Cadillac Cimarron
’90s: Ford Aspire
2000s: Pontiac Aztek

There are so many Hall of Shame contenders, and I didn’t even mention the Chevy Vega or the Ford Pinto. Can we just agree that French cars suit France and American cars suit America?

MICHAEL BROOK

NEVADA CITY, CALIFORNIA

Not a chance, Brook—Ed.

You covered the interesting but super-slow two-cylinder French-built Panhard, but omitted any mention of the Renault R8 Gordini. That 99-hp Gordini was a blast and a favorite amongst rally drivers, at least in Canada.

HAROLD FORESTER

LAVAL, QUEBEC

Meanwhile, in Quebec...—Ed.

Here are a couple more pieces of data for your 60th Anniversary issue:

The number of times David E. Davis Jr. is referenced in the issue (including one “Dave”): 26, or 1 mention every 6 pages. Only to be beaten by the number of times John Phillips uses the word “I” in his 62-line piece: 27, or 1 per 2.3 lines.

TOM FERRARA

POUND RIDGE, NEW YORK

CRASH, INTO ME

If I had only read Aaron Robinson’s driving history [“Roll the crash reel, boys”], as told by him in the July 2015 issue, prior to my ride-along at the 50th-anniversary celebration at

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LETTER OF THE MONTH

I can't be the only one who laughed at the fact that just pages after a column on all the cars he's wrecked, you put Robinson behind the wheel of a Mercedes-Benz 300SL ["Taking Wing," July 2015]. On a serious note, though, his article on that period was the best thing I've read in a long time, car magazine or otherwise. Very well done. Bravo.

JOHN BUSH

GIRARD, PENNSYLVANIA

We made him put up for collateral his house, his Lambo, and his autographed copy of It Takes a Village—Ed.

Indianapolis Raceway Park, maybe I would not have gone for that 145-mph ride in the Dodge Viper with him. Nah, I would still have gone. It was a blast.

JAN CARTER NICCUM

SAVOY, ILLINOIS

DISCO TIMES

Good article ["Empire Building," July 2015], but someone tell Jeff Sabatini that BMW 2002s don't use a throttle cable. They use a rod linkage and bellcrank.

SAM CHITWOOD

SPRINGFIELD, TENNESSEE

BIG '80S

In your "Miami Heat" article, you stated that you found "a young woman standing out front wearing only a bright-red, high-cut one-piece bathing suit." Do you really expect us to believe this unless you provide photographic proof? I searched for several minutes but couldn't find any.

MARK JONES

CORTLANDT MANOR, NEW YORK



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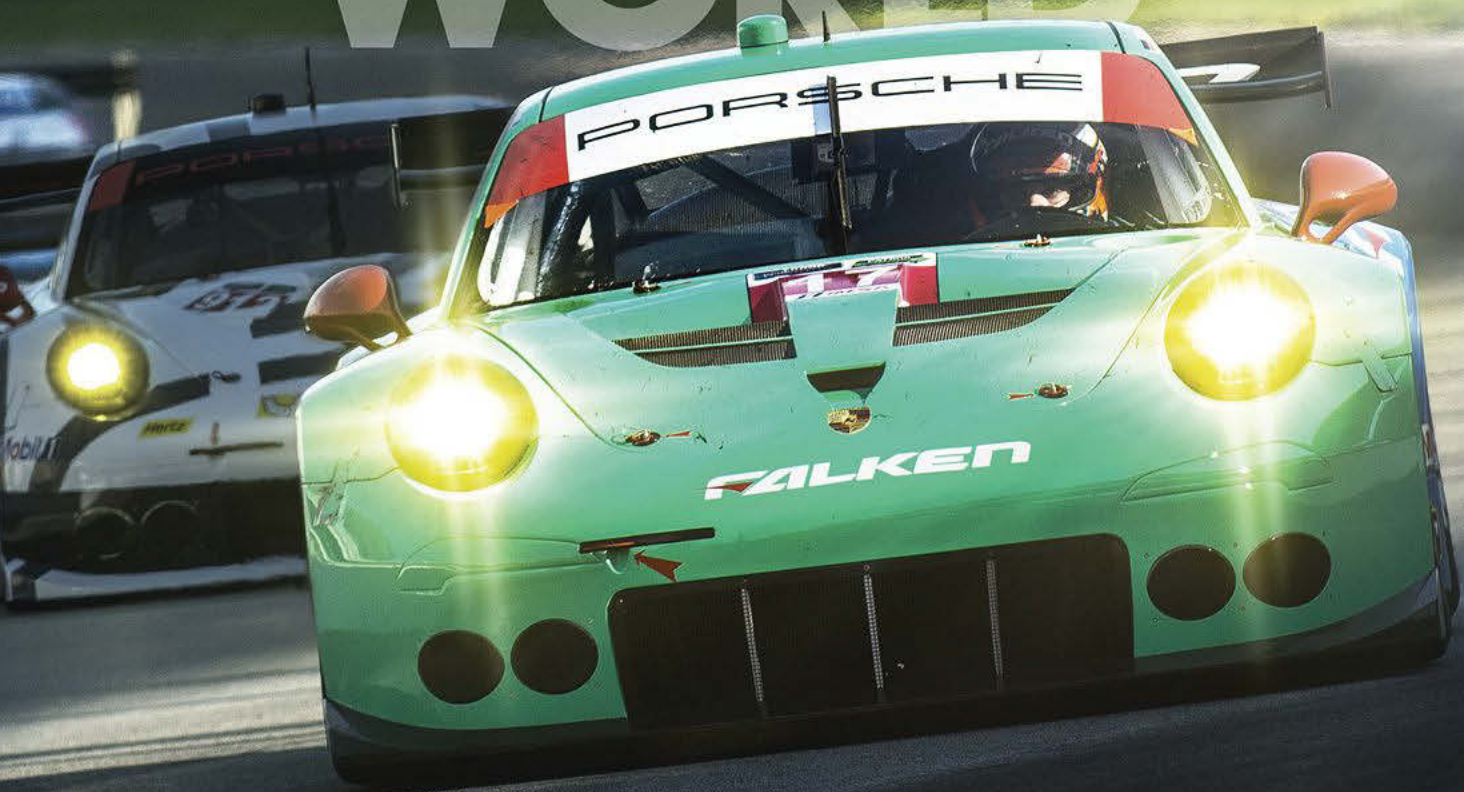
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★ BRIDGES OF AFFALTERBACH

HALF STOCK — Mercedes is bridging its regular models and full-blown AMGs with a line of “AMG Sport” vehicles. Full AMGs will now be branded Mercedes-AMG, while AMG Sports will follow the style set by the Mercedes-Benz C450 AMG Sport.

upfront

□ edited by JARED GALL



REVEAL OF THE MONTH

Above Average

MERCEDES-BENZ AIMS HIGH WITH ITS STUNNING NEW C-CLASS COUPE. *by Jens Meiners*

□ PLATFORM

The Mercedes-Benz C63 AMG has long been a favorite of ours. With a body only slightly larger than a Honda Civic and a massive 6.2-liter V-8 cranking out supercar power, how could it not be? Apparently others felt the same way. Globally, Mercedes managed to sell 40,000 copies of the previous-generation C63 coupe. Sans AMG treatment, though, the C coupe was less impressive. Neither its shape nor its dynamics raised the pulse; it came across more as a two-door sedan than a serious performer.

For the 2017 model year, Mercedes-Benz has set out to fix that. Even the base models get far more sensual lines and a sportier setup. AMG could have taken this newly athletic coupe, added a regulation number of black mesh grilles, and sat back to watch the sales roll in. But Affalterbach wanted more. Think of the

new AMG C63 as a gesture of appreciation for the faithful. AMG vehicle development chief Oliver Wiech says, “We felt a duty to lift it to the next level.”

□ DESIGN

Unlike its predecessor, the new C-class coupe is a car of classic proportions. The front clip is shared with the sedan, but from the A-pillars back every line is new. The low and compact coupe wears a relatively upright windshield and a softly sloping greenhouse. Wide, horizontal LED taillights are somewhat reminiscent of the AMG GT and the new S-class coupe.

This beautiful and sensual shape undergoes a character transformation in AMG trim. The whopper from Affalterbach is wider



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. *upfront* . REVEAL OF THE MONTH

THE REGULAR C COUPE WON'T BE AS AGGRO AS THE AMG, BUT THIS EXAMPLE WEARS THE FRONT FASCIA OF THE SPORT MODEL, WITH SIMILARLY SIZED AIR INLETS.

by 2.5 inches up front and 2.6 in the rear. Both the front and rear fenders are new and the effect is dramatic. Its proportions move this car close to the S-class coupe, distancing it from the base model far more than any of its competitors. Daimler insiders say that the changes for the AMG are nearly as extensive as those necessary for a completely different body style.

□ CHASSIS

The new C sedan is a capable performer in its class, but the coupe should do everything better. A 1.6-inch lower roofline and seating positions dropped 0.8 inch reduce the center-of-gravity height. The steering has been recalibrated to improve driving dynamics.

Again, the AMG C63 ventures further. Both the front and rear multilink suspensions are redesigned to the extent that the AMG shares no part of its rear axle with the regular coupe. Optional carbon-ceramic brakes and forged aluminum wheels reduce unsprung mass. The 255-wide front tires roll on 18- or 19-inch wheels. Out back, the 285-wide

rubber is carried by 18-, 19-, or 20-inch wheels. A conventional limited-slip differential is standard, while an optional electronically controlled unit is bundled with dynamic engine mounts similar to those found on the AMG GT S and the Porsche 911 GT3.

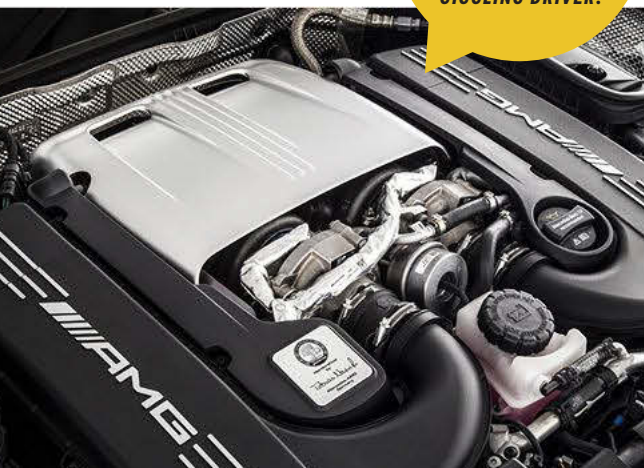
□ ENGINE

As with the C-class sedan, the coupe lineup begins with the C300, fitted with Daimler's 241-hp, 2.0-liter turbo four. Rear-wheel drive is standard; four-wheel drive is an option. The next step up is the C450 AMG Sport coupe, powered by a twin-turbo'd 3.0-liter V-6 rated at 362 horsepower. While it is derived from the European-market C400, a non-AMG model, the company insists that the 450 is "an integral part of the AMG family." The radically overhauled C63 coupe stands in contradiction to that notion.

We expect a sub-five-second zero-to-60 time. Top speed is governed at 155 mph, and four-wheel drive is standard.

Then there's AMG's twin-turbocharged 4.0-liter V-8 that produces 469 horses in the C63 and 503 in the C63 S. The ultimate C-class will charge to 60 mph in less than four seconds and top-out at a governed 155 mph, or an optional 180 mph, which is 6 mph higher than its predecessor. This is essentially the same engine that powers the AMG GT and successor to the legendary 6.2, which made its final appearance in the last-gen C-class coupe. The AMG C63 is rear-drive only.

FOREGROUND: PLAQUE BEARING SIGNATURE OF AMG ENGINE BUILDER. NOT SHOWN: GIDDY POWER, WITHERING EXHAUST ROAR, GIGGLING DRIVER.



The AMG C63 coupe will be entering a hotly contested class—and one of our favorites. Here's the tale of the tape:

BMW M4

BASE PRICE: \$66,395
ENGINE: twin-turbocharged 3.0-liter inline-6, 425 hp, 406 lb-ft
0-60 MPH: 3.7 sec
1/4-MILE: 12.0 sec @ 119 mph



Cadillac ATS-V

BASE PRICE: \$63,660
ENGINE: twin-turbocharged 3.6-liter V-6, 464 hp, 445 lb-ft
0-60 MPH: 4.2 sec
1/4-MILE: 12.6 sec @ 115 mph



Lexus RC F

BASE PRICE: \$63,325 (2015)
ENGINE: 5.0-liter V-8, 467 hp, 389 lb-ft
0-60 MPH: 4.3 sec
1/4-MILE: 12.8 sec @ 114 mph



Mercedes-AMG C63

BASE PRICE: \$70,000*
ENGINE: twin-turbocharged 4.0-liter V-8, 469 hp, 479 lb-ft
0-60 MPH: 3.9 sec*
1/4-MILE: 12.3 sec*
*C/D est.





□ INTERIOR

The driver looks at the same dashboard that graces the C-class sedan, and that's a good thing; this interior serves as the current segment's benchmark, with its rich materials and optional Burmester stereo system. Back-seat passengers clearly play second fiddle. The rear cabin is snug, even more so than in the preceding C coupe. Chief designer Gorden Wagener fought to sacrifice rear-seat and trunk space for the benefit of style, and we think it's worth it. Adults never fit in the back of cars in this class anyway.

No market is more important for the C-class coupe than North America. With its far stronger focus on sportiness and style than before, this Benz is easily distinguished from its predecessor. Prices will remain close to the C-class sedan's, or around \$40,000 to start, with the AMG C63 commanding about \$70,000. Look for the C300 to arrive next March with the C450 AMG and AMG C63 following in September. A C-class convertible will eventually emerge, but for excitement, look no further than the C63.



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FEW REAR ENDS LOOK AS READY FOR A DTM (GERMAN NASCAR) WING AS THE AMG C63'S DOES.



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IS 300 AWD F SPORT



1. Claim based on average horsepower from Lexus IS line year over year vs. 2016 Lexus IS line. 2. Ratings achieved using the required premium unleaded gasoline with an octane rating of 91 safety equipment and procedures. Do not attempt. 4. Claim based on 6.6-second 0-to-60 time of the 2016 Lexus IS 200t vs. 7.7-second 0-to-60 time of the 2015 Lexus IS 250. 5. Base model



IS 200t F SPORT

or higher. If premium fuel is not used, performance will decrease. 3. Performance figures are for comparison only and were obtained with prototype vehicles by professional drivers using special comparison of 255 horsepower for the 2016 Lexus IS 300 AWD vs. 204 horsepower for the 2015 Lexus IS 250 AWD. ©2015 Lexus.

Unnatural Selection

TODAY, BUYERS FACE A DISORIENTING ARRAY OF CHOICES—SOME BUYERS MORE THAN OTHERS. *by Csaba Csere*

PICKUP TRUCKS HAVE long been the kings of configuration—long or short bed? two doors or four?—but now there's a new challenger for multiple-choice supremacy: the van. Ford's big Transit [see "(Cargo) Vannin'," page 082] comes in three roof heights, two wheelbases, three overall lengths, and with a choice of three engines. All told, once a buyer has decided to get a Transit, he or she still has to choose from 33 distinct mechanical configurations—almost as many as Honda has in its entire vehicle lineup. And that's not even counting comparatively minor differences, such as the number of seats and how many and what type (hinged or sliding) of doors it has. And though both pickups and vans are offered in a seemingly endless array of configurations and lengths, only one can be the champion of choice. Let us guide you:



PICKUPS (FULL-SIZE)

CHEVROLET: 80 VARIANTS



FORD: 81



NISSAN: 4



RAM: 87



TOYOTA: 12



VANS (FULL-SIZE)

FORD: 33



MERCEDES-BENZ: 30



NISSAN: 7



RAM: 16

THE LITTLE SIBLINGS

PICKUPS (MID-SIZE)

CHEVROLET: 10

NISSAN: 14

TOYOTA: 12

VANS (COMPACT)

CHEVROLET: 1

FORD: 6

MERCEDES-BENZ: 1

NISSAN: 1

RAM: 2

56

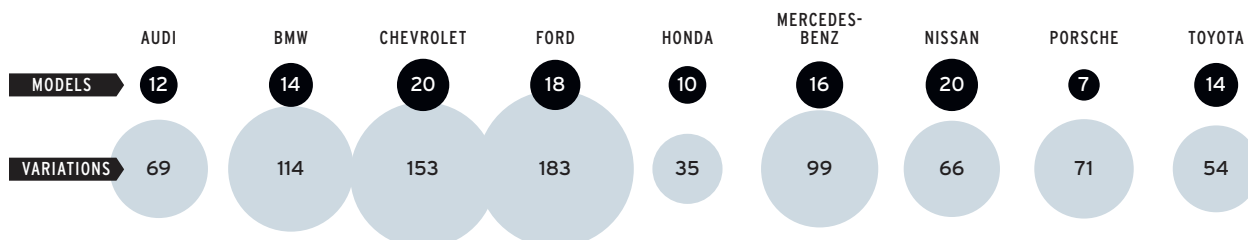
Audi offers four-wheel drive in 56 different vehicle configurations, the most in the industry. But as a percentage of total lineup, Audi falls behind Subaru. With the exception of the rear-drive BRZ, everything Subaru makes spins all four wheels. The Japanese brand offers 17 different ways to get four-wheel drive, representing 89 percent of its lineup.

Of Porsche's 71 different combinations of body, engine, and driveline layout, 23 are available with a manual transmission, the most in the industry. BMW comes in second, with 18.

GROWTH INDUSTRY

In 1980, BMW sold just four models—the 320i and 633CSi coupes and the 528i and 733i sedans. Each was rear-drive only, with one body style, one engine, and a choice of manual or automatic transmission, for a grand total of eight variations. Today, BMW has 14 model lines, nearly all with multiple engine options, and 12 offer four-wheel drive. **Total variations: 114.** The 3-series comes in three body styles, with six different engines and three trannies, totaling 19 versions. Add the 4-series into the mix and that part of the BMW family consists of six body styles and 36 variations. That's more configurations than distinct models offered in 1980 by Audi, BMW, Jaguar, Mercedes-Benz, and Porsche combined.

FULL LINES: For context, take a look at this selection of manufacturers and how many variations each has in its entire lineup.





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Milligrom

HONDA'S MINIBIKE IS AS MUCH FUN AS ANYTHING ON TWO WHEELS—ESPECIALLY ON CARPET. *by K.C. Colwell*

MOTORCYCLISTS SIGNAL THEIR TWO-WHEEL approval by dropping left hands while passing. But when you're riding a Honda Grom powered by a 125-cc engine and the rider of a 1340-cc Suzuki Hayabusa making around 190 horsepower gives you the low sign, it's hard not to laugh. That's like a Dodge Challenger SRT Hellcat's driver soliciting kinship with a guy in a Smart Fortwo.

Its name is derived from "grommet," a slang term for a young surfer. But the Grom is an old soul—part pit bike, part sport bike, and all fun. The only thing novice about it is how easy it is for new riders to approach. It's no scooter, though. It's a legitimate motorcycle with a four-speed gearbox, and it requires a motorcycle endorsement on the rider's driver's license. If you happen to need a two-wheel permit, the Grom is ideal for taking the riding test; its 47.4-inch wheelbase, low seat height, and 229-pound weight practically constitute cheating.

We dared not tackle a 70-mph interstate on the Grom. However, the bike does zip down 55-mph back roads with the compo-

PRICE
\$3349
WHEELBASE
47.4 IN
SEAT HEIGHT
29.7 IN
CURB WEIGHT
229 LB
ENGINE
SOHC 2-VALVE 125-CC
SINGLE-CYLINDER,
12 HP (EST),
11 LB-FT (EST)
TRANSMISSION
4-SPEED SEQUENTIAL
MANUAL
**OBSERVED FUEL
ECONOMY**
92 MPG

THE FAST SWEEPER
IN OUR LOBBY/
PSYCHEDELICS-
TESTING AREA
ALLOWS THE RIDER
TO LET ALL OF
THE GROM'S 12
HORSES LOOSE.



SAFETY FIRST – Riding gear, including carpet-burn-preventing Kevlar jeans, courtesy of Dainese.



MEGA MILLIONS — Since August 1958, Honda has built nearly 90 million Super Cubs and variants. This makes it the most produced motor vehicle in history. The bike is made in 15 countries and sold in more than 160.

sure of a bigger machine. We completed a lap of our 10Best loop without so much as breathing the throttle. It's wide-open almost everywhere, with a cruising speed varying between 52 and 58 mph, dependent on the slope of the road and the rider's attitude. Get into a tuck and the digital speedo climbs. Rise up and your body acts as an air brake, roughly doubling frontal area.

Technical director Don Sherman was sure that the street-legal Grom was too big to maneuver through our 90-degree cube farm. Proving him wrong—a rare treat—we idled between office couches and dividers and down the narrow corridors that make up our Ann Arbor HQ, putting a foot down but once over half a dozen laps.

At \$3349, the Honda Grom is far from a toy, but it is a very affordable way to get into motorcycling. It's extremely efficient—we averaged 92 mpg over 200 miles—and as much fun as anything you can drive to the water cooler. Just don't forget to wave back to fellow bikers.



photography by **MARC URBANO**

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Fine Whine

A SEMISERIOUS PROPOSAL
FOR RATIONALIZING SPEEDING FINES.

by John Pearley Huffman

$$T_A = T_R - T_R \left(\frac{50 - \left(\frac{ET - 9.8}{0.2} \right) - \left(\frac{B_{70} - 128}{6} \right)}{50} \right)$$

WHERE:
 T_A is the adjusted
ticket cost.

T_R is what the ticket
would cost according
to current practice.

50 is a constant.

ET is the vehicle's elapsed time in the
quarter-mile. The quickest car we've
tested is the Porsche 918 Spyder,
which clocked 9.8 seconds.

0.2 is a constant used to rate
vehicles according to their
quickness. Each 0.2-second increase
over 9.8 seconds increases the fine.

B_{70} is the vehicle's 70-to-zero
braking distance. The best braking
we've measured is 128 feet from 70
mph, achieved by the Chevrolet
Corvette Z06.

6 is a constant used to rate vehicles
according to their stopping ability
from 70 mph. Each six-foot
increment beyond 128 feet increases
the fine.

PEOPLE COMMIT COUNTLESS TRANSGRESSIONS behind the steering wheel, but speeding gets the most attention. As lovers of fast cars and the sensations they provide, we find that troubling.* This is, after all, the magazine that invented the Cannonball Run. Speed-limit enforcement is arbitrary, and the fines have no relationship to justice or simple fairness. Countless fees and charges continue to ratchet ticket costs ever higher.

So, fueled by a 48-can pack of Costco's surprisingly digestible Kirkland Signature Light Beer, we devised a sensible, easy-to-understand

means of bringing fine amounts into line by considering what type of vehicle is doing the speeding [see left]. An investment in high-performance machinery should, in *C/D*'s not-so-modest opinion, be rewarded with acknowledgment that the vehicle is capable of safely operating at higher speeds, while lesser vehicles driven fast are death on radials and deserve higher fines (which, granted, is a rankly regressive system that punishes the less fortunate and might just spur a revolution).

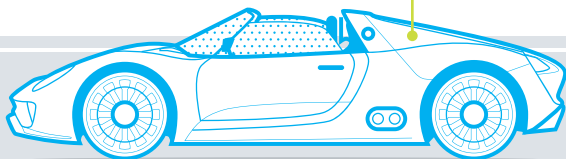
Of course, our own authoritative performance measurements would be used to set the fines. They've been deserving of legal weight for generations anyhow.

FINES WILL VARY ACROSS THE COUNTRY,
BUT LET'S ASSUME YOU'RE PULLED OVER
AND ISSUED A \$250 TICKET:

PORSCHE 918 SPYDER

A driver in a 918 (9.8-second
quarter, 142-foot braking distance)
would owe essentially nothing.

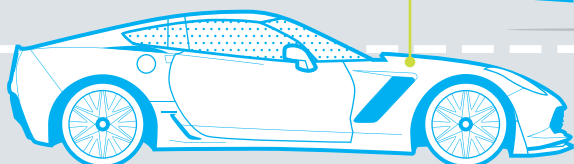
FINE
TOTAL
\$12



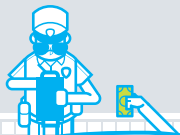
CHEVROLET CORVETTE Z06

A Z06 (11.1 seconds, 128 feet) would
earn its driver a tiny fine, but, over
time, there will be many of them.

FINE
TOTAL
\$33



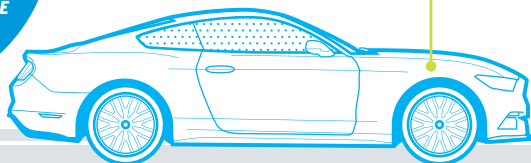
THE BENEFIT
OF THIS SCHEME IS THAT IF
SOMEONE HAS A DODDERING
WRECK THAT CAN'T EVEN
MANAGE SAFE MERGING SPEEDS
OR WON'T STOP IN THE SAME
CITY BLOCK THAT IT'S ON WHEN
THE BRAKES ARE APPLIED,
THEIR SPEEDING FINES WILL
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FORD MUSTANG GT

A Mustang GT (13.0 seconds,
149 feet) would save its driver
\$152 to put toward new tires.

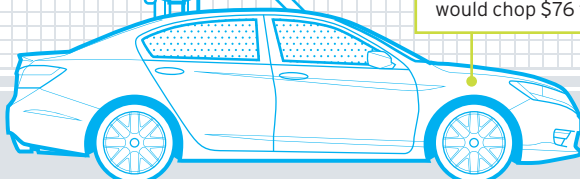
FINE
TOTAL
\$98



HONDA ACCORD SPORT

Our last long-term Accord four-
cylinder (15.2 seconds, 175 feet)
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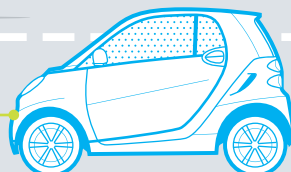
FINE
TOTAL
\$174



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If you drive a Smart Fortwo ED
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**BUT ALSO DARE TO DREAM.

illustration by MARTIN LAKSMAN



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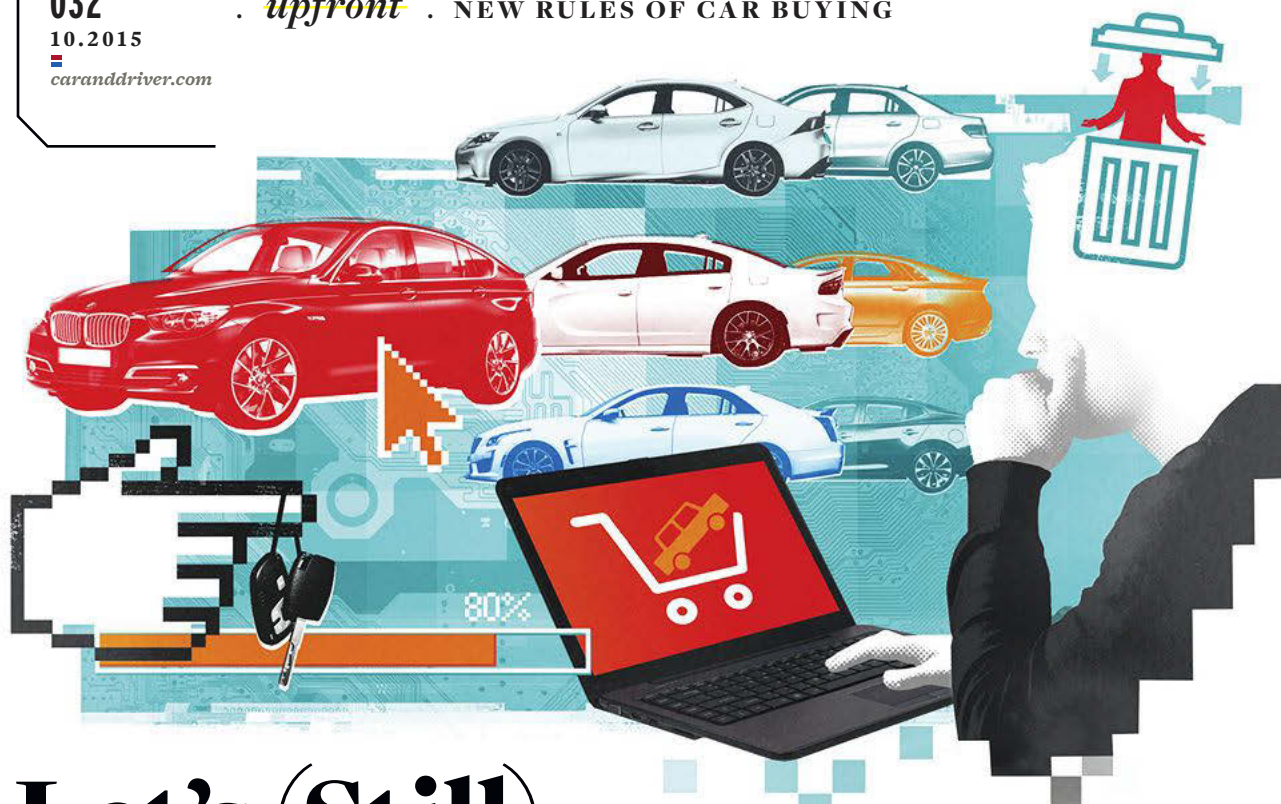
The first and only pickup with a high-strength, military-grade, aluminum-alloy body /// Up to 700 lbs. lighter so you can haul even more /// Best-In-Class EPA-Estimated Gas MPG: 26 HWY* /// Best-In-Class Maximum Towing: 12,200 lbs.** Best-In-Class Maximum Payload: 3,300 lbs.† /// THIS IS THE FUTURE OF TOUGH.

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Let's (Still) Make a Deal

THE FIRST IN OUR FIVE-PART SERIES ON CAR COMMERCE ASKS:
WHY DO WE KEEP BUYING VEHICLES AT DEALERSHIPS?
by James Cobb and Norman Mayersohn

TWO 20-SOMETHINGS WALKED into a car dealership...

No, that really happened—this isn't a setup for a joke. More than a quarter of the 16 million new-car purchases in the United States last year were made by that tech-savvy, marketing-averse group known as millennials, according to market-research firm J.D. Power. And virtually all those buyers ended up signing the paperwork and accepting the keys at an honest-to-goodness new-car dealership.

How could that be, in an age of painless online shopping, when you can buy everything from shoes to home mortgages via keystrokes, no trial fittings or handshakes required? Why can't you read the review of a new model on *Car and Driver's* website, click the "Buy It Now" button at the end of the article, and walk out to the driveway to await delivery by (large-capacity) Amazon drone?

FAR FROM USELESS

Despite a few experiments with direct sales that have generally not caught on, a notable exception being Tesla Motors's factory sales model, franchised dealers still control the new-car pipeline in this country. Their reign is unlikely to end soon. "The internet has dramatically changed the car-buying experience, but not the role of

the dealer," Maryann Keller & Associates wrote in a 2014 study for the National Automobile Dealers Association, a group that undoubtedly liked what it heard.

Long-established state franchise laws that largely prohibit direct sales by auto manufacturers are the biggest reasons dealers are mostly impervious to outside threats. The idea behind the franchise system is that third-party businesses can service customers better by fostering competition. A dealer who is independent of the automaker would, in theory, assure a broad inventory, provide competent repairs, and be an upstanding member of the local community, treating neighbors fairly and perhaps sponsoring beer-league softball or a kids' soccer team. And customers can comparison-shop Chevy deal-

ers easier than if they are taking on Chevrolet itself.

Compared with most purchases, online and otherwise, buying a car is a costly, complicated affair, more akin to a real-estate transaction than buying a shirt. The dealer arranges financing, collects taxes, handles the state registration, and offers an opportunity to see and drive various models before making a decision. It will take your old car on trade and stands ready to provide factory-warranty service and handle recalls.

"There has been a focus on outdated laws that protect dealers, but there is that consumer issue, and it is a real one," says Aaron Jacoby, chair of the automotive industry practice group at Arent Fox, a Washington, D.C.-based law firm. "Laws are still geared toward protecting consumers, and there is interest in how they

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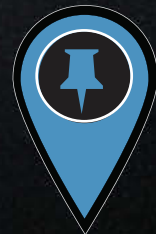
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Dept: CARDVR

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will get service for these major expensive things they are buying. How will recalls be handled? How will warranty work be handled?"

While more than a third of customers say they would consider buying a car directly online, according to a study by McKinsey & Company, most want to try before they buy. More than 80 percent of buyers take test drives, underscoring the continued strategic importance of dealers.

The number of dealers is declining, though, and that isn't necessarily a bad thing. Many marginal operations succumbed to the recession, and manufacturers bought out others that were smaller or less professional. Consolidation has created a national network of some 18,000 dealers today, 18 percent fewer than the 22,000 in operation just 10 years ago. While mom-and-pop operations dwindle, the largest dealer groups—such as AutoNation, Penske, and Group 1 Automotive—continue to add locations, boosting profit margins and efficiency. Bigger can be better for customers as well. The dealer groups offer more choices, with AutoNation listing some 70,000 vehicles for sale nationwide, all searchable online. Once you find the exact model you're looking for, the car can be shipped to your local store for delivery.

CHASING TRANSPARENCY

Buying a new car remains a bricks-and-mortar transaction, an actual physical exchange of paperwork for keys. The sales environment is changing, however, as dealerships face up to the internet's new reality. Today's customers, millennials in particular, demand transparency, simplicity, speed, and trust. "Customer expectations are being shaped by retail experiences largely online," says Jeremy Anwyl, principal of Anwyl Partners and former vice chairman of Edmunds.com, the auto-shopping website.

A tsunami of information is within easy reach of anyone with a laptop or a smartphone. Data-gathering websites detail exactly what dealers pay for cars, while independent companies compile full inventories of available vehicles, reveal what other buyers paid for the exact model under consideration, and connect shoppers to the dealer with the lowest price, often guaranteed in writing. Increasingly, buyers are striking virtual deals with salespeople they haven't met, filling out forms and initiating the transaction from their living rooms. A study released this year by Autotrader.com, which included a survey of more than 4000 car shoppers, found that 56 percent wanted to start negotiating on their own terms, preferably online, and that nearly three-quarters wanted to complete the credit and financing paperwork that way as well.

"You talk to consumers about what bothers them. One is a lack of feeling comfortable with the price, and another is a feeling that their time is being wasted," reports Anwyl.



Today's customers, millennials in particular, demand transparency, simplicity, speed, and trust.

So the goal for dealers today is to complete the deal and hand over the keys within an hour. Still, a complicated credit history can stretch the process toward, and beyond, the industry average of four hours.

Another bottleneck in the process is the trade-in. "Why don't people buy more new cars right now?" asks John Krafcik, president of TrueCar, an online pricing-and-information site that funnels buyers to dealers. "Probably because the thought of selling their current car is so horrible."

TrueCar attacks this problem with a smartphone app to expedite the trade-in process. You snap photos of your car, answer a few questions about its condition, and TrueCar will solicit bids from dealers in your area, then send you back the highest offer. Assuming that an inspection verifies the claimed condition, the dealer will cut you a check for the car or honor the stated value as a trade-in. By the time the

TrueTrade process is fully implemented next year, TrueCar says you will be able to take your car to many of the 10,000 dealers in its network to receive the guaranteed price.

Online pricing tools may have helped to reassure wary customers, but some parts of the transaction, such as lease calculations or payments from manufacturers to help cover dealer costs, remain inscrutable. "There is partial transparency," Anwyl says, "but it is not complete."

GETTING SATISFACTION

To a public increasingly accustomed to online shopping, the dealer model may seem old-fashioned. But Jacoby, the lawyer, says that automakers and dealers "are slowly figuring out the dance toward how they themselves would dominate the internet." He points to FordDirect.com as an example. That site—and similar efforts such as GM's Shop-Click-Drive and Scion's Pure Process—allows you to build a vehicle to your specification, gives you an "internet price," and links you to a dealer for delivery. FordDirect claims to have helped dealers with more than 600,000 sales last year.

Another factor in favor of dealers: Customers seem to like them better than ever before. Two of J.D. Power's studies, the Sales Satisfaction Index and the Customer Service Index, have been on the upswing for years (except for a slight dip in 2015 for the service study), suggesting that dealers have been cleaning up their houses.

"People are more satisfied with dealers today than they have been," says John Humphrey, senior vice president for global automotive operations at J.D. Power. "It's evident in trend numbers from our surveys. They're more satisfied when they buy and when they go for service."

Adds Anwyl: "It is not inherent in the franchise system that customers can't feel happy and have a great experience when they buy a vehicle. It does mean that manufacturers and dealers need to clarify their roles and responsibilities and work together."

So while there is still no simple way to buy a car, technology has leveled the playing field. That gives the customer more clout.

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Let's
Go
Places

Prototype shown with options. Production model will vary. ©2015 Toyota Motor Sales, U.S.A., Inc.

by John Phillips

👤👤👤 NIGHT AT THE MUSEUM.



Last week I drove C/D's long-term Mini Cooper S to the LeMay Museum in Tacoma, Washington, 1500 miles round trip. Not LeMay as in "Old Iron Pants" Curtis, but LeMay as in garbage mogul Harold, who, before stripping his mortal gearbox in 2000, employed 530 refuse workers and amassed a car collection whose provenance spanned 100 years. *Voilà*, a ready-made museum, although the building that would house Harold's hobby—designed by Alan Grant and resembling a giant segmented worm covered in Reynolds Wrap—took two years to assemble.

Inside are 350 vehicles and 200-plus volunteers scattered over 165,000 square feet. Fifty of those cars are privately owned and come and go in six-month intervals. Every car in

the museum is a runner, except for a 1917 Simplex Crane whose engine is out for rebabbiting, as well as the very first Studebaker Avanti, which is out for a frame-off resto, in part to remedy its vomitous sparkle-green paint. The cars are repaired on site by Dale Wickell, whose workshop is always open for viewing. As I watched Wickell fiddle with a '69 Camaro Z/28, Renee Crist, the museum's collection manager, told me: "We drive our cars. All of them."

Which is how I wound up touring Tacoma in a 1970 Olds Cutlass 4-4-2 convertible. It was a car that, 45 years ago, I almost persuaded my father to buy. Yet I'd never sat in one. Pale blue, with a dark-blue interior, roll-up windows, and a smoothly idling engine, the 4-4-2's overall structure recollected jellyfish anatomy, and the battleship hood shivered like a gaffed tuna. Floaty suspension, too, more or less completing the nautical motif as we cruised past Tacoma's harbor. "Tippecanoe and 4-4-2," I said, and Crist smiled.

I was invited to the LeMay to attend an annual fundraising soiree called "Wheels & Heels," the latter referring to the attire adorning the grandees gathered in the museum's Concours Club. I owned no heels, so I introduced myself as the kind of heel you'd find on Skid Road. The members seemed to grasp this with no further explanation, perhaps because they've

coughed up \$53 million in endowments, whereas I coughed up \$5 to park the Mini.

"No museum makes it on gate proceeds," said David Madeira, LeMay's CEO. "And when people are asked to support rare cars, they say, 'Whoever owns these automobiles is rich; let *him* do it.' Anyway, most car collections are vanity projects—one person's cars, cars that interested him. That's why we have a dozen rotating exhibits, so a guest can come twice a year and not be bored." Madeira told me that 170,000 people visit the LeMay annually.

"We're the largest-drawing car museum in America, by far."

Among other swells, Rick Hendrick showed up to receive the museum's Nicola Bulgari Award for some sort of automotive derring-do that was never made clear to me, and a couple of Bulgaris were on hand to present the sterling-silver trophy. Hendrick wore a Johnny Cash suit underpinned by black sneakers. "One of the highlights of my life," he said, "was riding around Rome in one of the Pope's cars," an event organized by a Bulgari, if I understood correctly. "Like Harold, my dad owned 350 cars before he died," Hendrick told me, "250 of which we couldn't get anyone to pick up." Then both of us were introduced to Harold's widow, Nancy LeMay, to whom Hendrick said, "You are one frisky lady." She liked that.

During dinner, items of swaggery were auctioned off. My wife and I pursued a coffee-table book called *Roar with Gilmore* and were eventually lured to a dizzying \$35 bid, which is when one of the aforementioned Real Heels bid \$139. Goodbye, Gilmore.

Turns out glass sculptor Dale Chihuly, he of the pirate visage, is crazy for the LeMay and thus offered for auction a blown-glass bowl called "Cinnamon Macchia." It was the size of a football and looked to me like a neon sea anemone, although I was told it contained fantastic "dust and small chunks of glass called jimmies," which less-well-heeled persons might call mistakes. Anyway, just as I bit into a tender piece of beef, I noticed a white auction placard being waved high in the air and attached to my wife's arm. A Chihuly devotee, she shouted, "\$2500," which caused one of those super-animated bidder's assistants to materialize instantaneously, looking very optimistic. Goaded either by his manic encouragement or by a second gin and tonic, she next shouted, "\$4500," an incremental jump sufficient to cause me to spit

a portion of beef, which made an impressive splat-landing beside my dinner partner, a fashion editor in a sparkly gold gown. That's when a similarly attired lady across the room shouted, "\$6000," and, even as I was gasping for oxygen, my wife lowered her paddle and said, "Oh, well."

Fireworks followed, launched from a parking lot mere feet away. Some of the detonations were so close as to deposit ash on my shirt. But compared with the auction's fiscal land mines, the incoming artillery felt like a warm bath in Valium. ■



► Great weather, 350 collector cars, and "my" Olds 4-4-2.

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by Aaron Robinson

WE BOUGHT A SPACE APHID. GOT A PLUG WE CAN USE?



My wife, Tina, watched the new owner of her old Volkswagen Golf reverse down our driveway and putter off. Then she went into the house and lay down on the floor and cried. In an effort to comfort her, I fanned her with the stack of fresh \$100 bills, a stack that was even bigger than I had dared hope when I put up the Craigslist ad with its highly optimistic price. But it was no use. That Golf was a steel box of memories. She bought it new after graduate school and always planned to keep it until the wheels fell off. After 104,000 miles, only the little “VW” wheel badges had fallen off, parting company for the gutter somewhere along the line. The Golf had been a good car, a dependable car, her car, but it had grown old and a little infirm, and she agreed the time had come for a fresh face. A seat heater

and Bluetooth were required. A half-hour later, the shiva apparently over, I watched her drive off in her new car, which was silent but for a silly, transporter-beam hum from behind a front wheel. The noise always reminds me that I still have to get behind that wheel and, per some instructions I read on a forum, unplug the wire to the speaker making the sound. Yes, there’s a forum for the Mitsubishi i-MiEV.

“The what?” That’s what everybody says when you tell them you bought a Mitsubishi i-MiEV, which is variously pronounced “Eye-Me-Evv” or “Eye-Meev” but never as Mitsubishi intended it, which is “Eye-My-Eee-Vee.” Hardly anybody we’ve met has ever heard of this little electric orb or seen one in person, which makes it like a lot of cars we’ve owned over the years, from the World War II ambulance to the Mazda Bongo Friendee.

As you’ve probably guessed, buying the Eye-My-Eee-Vee was my idea. Tina likes compact hatchbacks, but I wanted the Mitsubishi. The main reason is that I like the car, having previously driven both it and its predecessor, the Japanese home-market Mitsubishi i, a K-class minicar with a turbocharged 659-cc gasoline three-cylinder engine under the rear floor. It looks like the future—not exactly the car of David Starr, Space Ranger, perhaps, but the one his housekeeper drives—and its



► Our odd experiment in EV cheapness. Welcome, insect!

packaging is brilliant. With the 66-hp motor in back and the 16-kWh battery in the floor, the i-MiEV carries a lot of its 2600 pounds in the keel, meaning the car is anything but tipsy, even on its 145/65 front tires.

I’m not here to proselytize, but no way, no how can you beat the i-MiEV for cheap motoring. The Chicago used-car dealership where I found it online wanted \$8500 for this loaded 2012-model SE with the Premium navigation/Bluetooth package and 2616 miles. Plum purple wasn’t my

first color choice, but it was what they had. True, our monthly electric bill has jumped by more than 50 percent since the i-MiEV arrived. Last month it was \$74, meaning we drove more than a thousand miles at a cost of about \$26 in juice.

Its range is between 50 and 70 miles, depending on how you drive it. Obviously, if you’re driving more than 70 miles every day, you need a different car. Or, better yet, a different life. Meanwhile, we’ve driven the i-MiEV all over Los Angeles and have yet to be stranded. It is definitely not all the car we need in every situation, but we’ve found it enough of a car to work just fine about 95 percent of the time.

An EV isn’t for everyone. It forces its driver to confront the ravenous energy appetite of even the smallest automobile. Switch on the Mitsu’s air conditioning, for example, and the car’s indicated range drops by five miles. The A/C in conventional cars also sucks energy, but we don’t notice because hydrocarbon fuel is plentiful and relatively cheap. Driving an electric car is a constant exercise in energy management, sometimes presenting us with the choice of being cool on a hot day or running short of watts in Watts.

A recent study by some economists determined that EVs, rather than getting tax breaks, should be taxed at higher rates in the coal-dependent East and Midwest for the indirect air pollution they cause. Out here in La-La Land, though, our grid is more diversified with wind, solar, hydroelectric, and natural-gas generation. The Union of Concerned Scientists produced a study in 2012 saying that the i-MiEV on California electricity produces the same greenhouse-gas emissions as a car with an 88-mpg combined fuel-economy rating. In coal-heavy Michigan, however, the i-MiEV is only a 43-mpg car.

We didn’t buy it as much to be green as to be cheap, though zero emissions is a wonderful side benefit of not cold-starting an engine or idling it at lights during the mostly short trips my wife takes. And, as it occurred to me recently as I lugged all 17 sticky, sloshing quarts of used motor oil to the recycler following a routine service to my Lamborghini Espada, there are no oil changes on an EV or much of anything else to service.

California regulators like the i-MiEV, going so far as to grant all EVs free access to the carpool lanes. But does Tina like it? “It’s definitely quirky,” was about all I could get out of her. Well, give it time. ■



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GOODYEAR.
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by Ezra Dyer

JOURNEY TO LAP-LAND.



The moment I joined *Car and Driver*, I set about scheming my way into the Lightning Lap testing at Virginia International Raceway. From the outside, Lightning Lap looks like everything you dream about at the Academy, when you're just a snot-nosed QWERTY jockey scrubbing latrines every time you dangle a participle in front of the Sarge. Fast cars, fast track, all action; that's why you sign up for a gig like this. And buddy, the stakes are high. One wrong move and you'll be back working the motor pool, detailing Toyota Yaris hubcaps for the photo shoot on the Alberta tar sands.

I didn't really get invited to Lightning Lap so much as I invited myself, so I figured I should make my presence worthwhile. To that end, I arrived with a Ram 2500 Power Wagon

towing a 26-foot Airstream Flying Cloud travel trailer. I parked right outside the garages, delivering two items much in demand: air conditioning and a bathroom. To ensure that everyone felt welcome, I extended the awning, set up a couple of folding chairs, and hung a sign that read, "C/D Official Hopsitality [*sic*]." The Airstream also had a pretty good stereo, dynamically optimized for cranking some Skynyrd.

The Lightning Lap crew is led by K.C. Colwell, who oversaw 18 cars this year and ensured that each one got an ample chance to prove itself, all while collecting data, photos, and video that will immortalize any mistake. So I'm sure he was grateful to have an extra hand on board, another skilled shoe at the ready. Sure, Colwell would say stuff like, "Please don't drive any of the cars," and "Don't touch that," and "That's my lunch you're eating," but I can read between the lines. He wanted me out on the track.

Unfortunately, *Car and Driver* arrived with a full complement of wheelmen, almost as if they'd been successfully running this event for years before I even showed up. But there were a lot of cars that needed wringing. I swear by Patrick Dempsey's beard stubble that I've never seen a better-stocked row of garage bays: Porsche 911 GT3, Chevy Corvette Z06, Mercedes-AMG GT S, Lamborghini



► No, Dyer, we do not want to hear "Freebird" again.

Huracán, McLaren 650S Spider, Alfa Romeo 4C. I asked if any of them needed to have their frames bent by extreme g-forces—as in, those generated by my driving. "I think there's a Mustang EcoBoost with bad gas in it," someone replied.

And that gas had to go. So I strapped in and headed out for some low-octane recon laps, the Mustang running like it had a tank full of bad enchiladas. Lightning Lap uses the full 4.1-mile Grand West Course, so it takes a good many laps to learn which way all the corners go, let alone the fast

line all the way around. Given the Mustang's sickly pace, I had plenty of time to check out all the skid marks trailing off into the grass, into the walls, into my psyche. The skid marks at VIR don't just go straight. A lot of them are double helixes scrawled from spins, the crime-scene DNA of bad decisions.

After a number of leisurely trips around the Virginia countryside, I returned to the pits to see what kind of action was afoot in the garage. It was a lively scene. The GT3 and Z06 were out of commission, having gone to the edge of the track and then somewhat beyond. The McLaren PR rep was ragging on the Lamborghini guys about the Pirellis on the Huracán, pointing out that they were embossed with the label "MC"—meaning that they were developed for McLaren. Eric Tingwall was ruminating on Ferrari's ever-lower Fiorano lap times. "Every new car is a second quicker than the last one," he said. "So eventually, they'll have a lap time of zero." As with many scenes of adrenaline-fueled daring and machismo, there appeared to be a lot of standing around and eating Cool Ranch Doritos. So I applied myself to that.

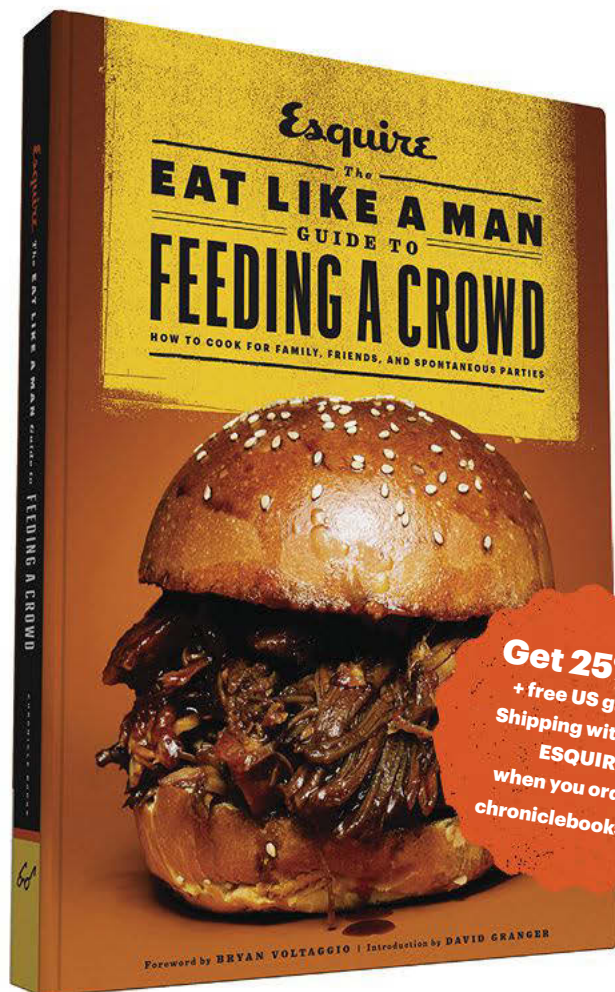
Eventually the Mustang was refueled with 93-proof and the scoring began. After the official timing was complete, I hopped in for a few more laps to see how I'd fare with the clock running. A lap at VIR takes about three minutes. As I soon learned, it's really hard to do everything right for three minutes. I can't go three minutes without screwing up even if I'm just sitting on the couch. "Honey, I know *Orange Is the New Black* is on Netflix! I just went to Hulu to make sure it's still working. Damn! Now look. I spilled my Narragansett."

We don't need to dwell on every transgression against technique that I committed out there, but I'll say that the adrenaline of a timed lap caused me to hulk out on the shifter in creative ways. I upshifted from second to fifth. I downshifted from fourth to first (that one was memorable!). The lesson, as always, is that surely this was somehow the car's fault. Come on, Dearborn, can't we make a transmission with a really obvious third gear? Heel-and-toe? More like feelin' slow. Or heel-and-NO-thanks. Those are the kind of Mustang headlines that I would write.

Back in the pits, we looked at the VBox data and determined that, well, everyone agreed that I brought a hell of a trailer. ■

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LIGHTNING LAP NO. IX

THESE ARE TIMES OF BIG PERFORMANCE CLAIMS. AND WHAT BETTER PLACE TO TEST THEM THAN AT AMERICA'S HAIRIEST TRACK? THIS YEAR, WE RETURNED TO VIRGINIA INTERNATIONAL RACEWAY WITH 18 CARS AND A HEALTHY DOSE OF SKEPTICISM. IT MADE US BELIEVERS.

BY ~

K.C. COLWELL, TONY QUIROGA, AARON ROBINSON, AND ERIC TINGWALL

PHOTOGRAPHY BY ~

MARC URBANO

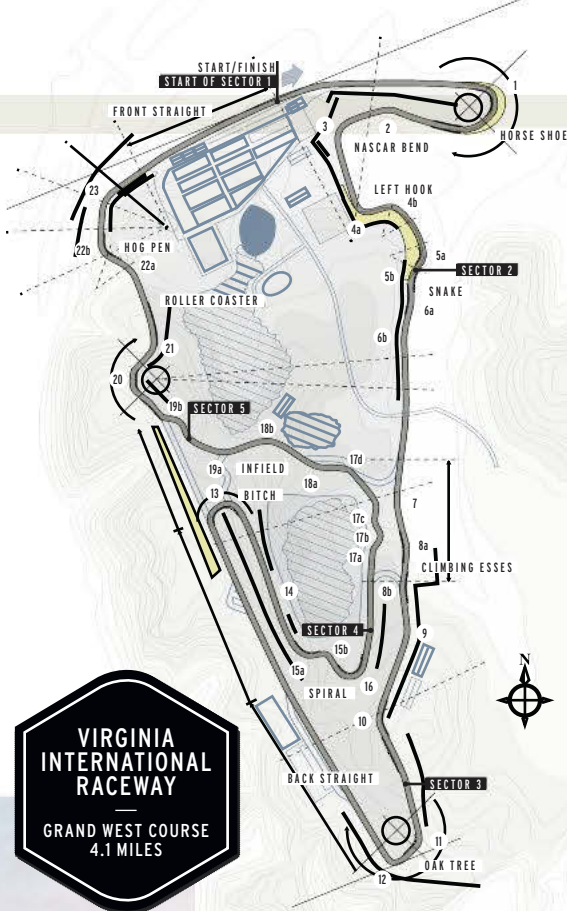


months before our annual pilgrimage to Virginia International Raceway (VIR), every participating editor experiences some variation of the following nightmare: We can't bring our

lap times down; P Zeros and Super Sports won't grip. Then storm clouds appear from nowhere and a steady rain begins to fall, leaving a layer of water on the track indicating that we're done, total failure, no lap times to bring back home. Instead of this story, we publish 12 pages of men's hair-product ads and right before we awaken with a silent scream, our pants vanish and our fourth-grade teacher appears, slapping a torque wrench against her open palm.

Alas, it's just a dream, but our three waking days at VIR are only slightly less stressful. As yet, though, nobody has lost any pants.

Every year we gather the hottest new performance cars, group them by base price including performance-enhancing options rather than size or power, and then reduce them to lap times. The point, as ever, is to see how much performance integrity these street cars actually offer, how much true dynamic value you get for the dollar. VIR, specifically the Grand West Course, is our crucible of choice. A



VIRGINIA
INTERNATIONAL
RACEWAY
—
GRAND WEST COURSE
4.1 MILES

are the \$353,115 McLaren 650S Spider and the \$274,120 Lamborghini Huracán LP610-4. At the other end of the spectrum sits the new \$33,320 Mazda MX-5 Miata.

After two and a half days spent circling VIR, we posted some of our quickest times ever. Lightning Lap might wrack our nerves and keep us up, but it's also one of the best workweeks anyone can imagine. It's a rare instance of reality far exceeding the dream.



MAZDA MX-5 MIATA CLUB 3:20.8

BASE PRICE: \$32,820 • AS-TESTED PRICE: \$33,320
155 HP • 2309 LB • 14.9 LB/HP

Think of Mazda's affable roadster as Snuggle, the giggling fabric-softener bear, in the form of a sports car. Bend the MX-5 into the right-hander at Horse Shoe and the inside wheels droop hilariously, the gaps yawning at the high afternoon sun. Bomb over the curbing through the uphill esses like you would in a Nissan GT-R and it becomes a sad bear, the hard impacts upsetting the body and the tires' traction.

Yet when the car is leaned over and the tires are loaded, the Miata behaves like a

winding, hilly track engraved into a lush southern Virginia forest, the 4.1-mile configuration offers 24 corners and countless ways to screw up. With debilitating speed limits now in place at the Nürburgring, many carmakers, including Dodge, Ford, and GM, have come to VIR as their track of record, too. But we were here first.

This year, four editors divvied up a group of 18 cars. We ran through our assignments, methodically trying to extract the best lap time out of each machine. We check each other's times, too, and usually find that we're within a half-second of one another.

Part of the reason we're up at night is the pressure of having to learn a car in a few laps. Where to brake, where to shift, and when the throttle is safe to crack open are

points as varied as each car's behavior at the limit. Plus, we have to find speed without hurting the car or ourselves, erasing time from each lap. On some cars, we have one go at it, maybe two, to score the best time before fresh tires fade out. A single mistake can blow the opportunity.

But we've done this before. Eight times, actually. For this, the ninth Lightning Lap, a couple of last-minute dropouts, including a Dodge Challenger SRT Hellcat, reduced our usual fleet of 20 or so down to the 18 before you. Rest assured, if you don't see it here, we've either already tested it or we asked for it and were politely told, "No." Yes, we requested a Ferrari LaFerrari and a McLaren P1. Both companies replied that they didn't have cars available for our test.

This year, the cars priced like mortgages

perfect rear-drive pet, vectoring precisely with the throttle. Keep your foot in the right pedal to swing wide in a turn, or lift to tuck the nose and cinch your line tighter. The rear tires slide with a controlled and predictable attitude when they do break free, and they're easily brought back into line with quick, tactile steering. Nestled in the hammocklike seat, the driver rolls and rotates in harmony with the car.

The Miata's unhurried pace is no surprise. With just 155 horses, the fourth-generation MX-5 is the least powerful car to ever officially compete in this event. Its peak speed of 110.2 mph is more than 10 mph slower than any other car in this year's test.

Still, it finishes far ahead—8.5 seconds, in fact—of the slowest car we've ever run, a 2006 MX-5 entered in the inaugural event. The new Miata is 166 pounds lighter than that car, and nine years of tire development have yielded big gains in lateral grip. While the modern Miata still wants for straight-line speed, its cornering velocities match those of its LL1 peers. So don't call it slow.

We'd parse the Miata's lap, but to do so would be to miss the point. The Miata sits at the top of the leader board when it comes to fun, and no car is better at teaching you how to drive than this one.

FORD MUSTANG ECOBOOST

3:15.6

BASE PRICE: \$29,790 • AS-TESTED PRICE: \$38,660
310 HP • 3658 LB • 11.8 LB/HP

Our first suspicion was a tank of 87 octane. At least, we think that's why the Mustang EcoBoost refused to make any boost. High ambient temps probably didn't help, either. So we burned off the first tank of fuel and started over with a tank of 93 octane.



Lap times improved, but even with the fresh fill, the Mustang still wouldn't give max boost as the 2.3-liter four revved to its 5500-rpm power peak. Without full boost at the power peak, we're thinking that a few of the engine's claimed 310 ponies ended up at the glue factory. After experimenting with our upshift rpm, we determined that the quickest times happened when we shifted just as the boost began to fall. Shifting with the boost gauge instead of the tach is something entirely new to us.

With the power delivery figured out, we were able to enjoy the Mustang's Performance-package chassis. A track-worthy set of springs, shocks, bushings, and brakes, plus 255/40ZR-19 Pirelli P Zero rubber, provides strong grip and unerring stability. The new independent rear suspension works with the front. In the live-axle Mustang, the front end would take a set and the rear end would follow sometime later.

The lighter nose of the four-cylinder Mustang is immediately noticeable as it zaps into corners more quickly and easily than the V-8 GT. There's less understeer than in the V-8 version, too. Brake feel is about perfect, with good bite, zero fade,



and very little lost travel. Going into the Climbing Esses, the EcoBoost enters at a very low 106.4 mph. But that low speed means the EcoBoost's throttle can be held to the floor the entire time. Flooring a car through the esses is a clear sign that you're in a car with more chassis than engine.

A lack of power kept the EcoBoost Mustang from going quicker. But those problems were solved by the Mustang GT.

MINI COOPER HARDTOP JOHN COOPER WORKS

3:15.4

BASE PRICE: \$32,950 • AS-TESTED PRICE: \$34,850
228 HP • 2862 LB • 12.6 LB/HP

With the Mini's tires pumped to their recommended high-speed pressures—45 psi in front and 42 out back—the 2862-pound JCW lapped like a dinghy in rough seas. Never mind that the freshly paved outer ring of the Grand West Course is rather smooth; the JCW hopped side to side while running down the straights. It wagged its rear end under braking and overzealously pivoted into turns.

We ultimately pulled 6 psi from each tire (bringing the hot tires down to their recommended cold pressures), and while the JCW still wouldn't follow a straight line at triple-digit speeds, lower pressures softened its bad behavior. The Mini's eagerness to oversteer settled into a more predictable





willingness to just turn, a rare but useful trait in a front-drive car.

The hottest Cooper sheds speed with strong Brembo brakes that offer positive feel and action at the top of the pedal travel, and they showed no evidence of fade at the end of a lap. Its 228-hp turbo 2.0-liter pulls hard at any rpm, and the automatic transmission holds its gear at redline and responds to the paddles promptly.

As in the last-gen JCW, the lack of lateral support in the seats probably compromised the lap time. Without adequate seat bolsters, the driver shreds his left knee against the cheese-grater speaker cover in the door. Don't wear shorts.

Though the John Cooper Works is lighter and more powerful than the GTI, it is slower around the track. Its Achilles' heel appears to be the Pirelli P Zero rubber that heats up and then gives up. That explains why the Mini was the quickest of the budget contenders through the high-speed esses but relatively slow late in the lap. When the tires begin their meltdown, the chassis isn't far behind. Pushed to its limits, the JCW exists in a difficult-to-drive middle ground somewhere between the stability of the GTI and the controllability of the Miata.

VOLKSWAGEN GTI 3:14.6

BASE PRICE: \$27,100 • AS-TESTED PRICE: \$28,095
220 HP • 3076 LB • 14.0 LB/HP

The return of the seventh-generation GTI to Lightning Lap is a rare second chance. Last year, the Mark VII GTI only matched the time of the Mark VI, but this year the

GTI ran 4.7 seconds quicker. What gives? Well, it's better equipped for the task at hand this time, wearing two doors instead of four and sporting a manual transmission in place of the dual-clutch automatic for a 59-pound weight advantage. More important, though, this year's car included the optional (and unavailable in '14) Performance package with an extra 10 horsepower, for a total of 220. It also has larger brakes and a proper limited-slip differential; all of these additions are significant enough for us to give it another shot.

It's that last piece of hardware that makes the largest impact. Where the open diff lets the car smoke its inside-front tire like so much Bockwurst, the Performance-pack GTI charges out of the slower turns. Thus, the car picks up the bulk of its time on the tightly coiled second half of the Grand West Course. An average speed of 73.3 mph makes the GTI this year's quickest LL1 car through the infield, where it went more than 3 mph faster than last year's model.

The Performance package doesn't change the GTI's chassis attitude, which is stable to the point of stubbornness. Man-handle the VW into a slide and the omnipresent stability control shuts down the party faster than campus police during move-in week. The GTI remains the long-reigning emperor of hot hatches, but the implacable under-steer means it's more gratifying on an unfamiliar back road than when pushed to its absolute limits at your local circuit. If you are headed to the track, though, the \$1495 Performance package is not an option, it's a must.



Fitness

SUBJECTING AN AVERAGE CAR TO THE PERILS OF VIR.

Every year, without fail, reader response to Lightning Lap includes multiple pleas to enter an everyday car—a Camry, an Accord, a Fiesta without an ST badge. You know, an average ride built for the average commuter. Well, this year we happened to have our long-term 2015 Honda Fit EX present at VIR and we put it to work, the test gear strapped in for what might be the slowest lap in VIR's Grand West Course history.

Everyone was sure the 130-hp hatch wouldn't break four minutes. Everyone was proven wrong when it did a respectable 3:37.7.

But what's most surprising is how comfortable the wee Fit is on a track. Sure, the all-season tires howl in protest, the economy-oriented engine can barely muster 104 mph on the front straight, and you're fighting to stay in the flat seat against 0.74 g's worth of cornering grip. But the brakes don't fade, stability control doesn't intervene, and the steering is delightfully light and precise through faster corners. Beneath its overstyled skin lies the soul of a contender.

Part of the Fit's speed—and this is a relative term—comes from being so narrow. Take the esses, for example: The skinny Fit essentially straightens out the curves, having to turn less than a wider, faster car. Plus, with its entry speed lower here than the exit speed or the esses' average speed (94.8 mph), the Fit's driver is dead flat on the throttle throughout the whole climb.

Going wide open through any corner is a total hoot, regardless of whether you're in a go-kart or a golf cart. But please don't ask us to lap a golf cart.

VIR SAYS GRAND WEST IS COMPOSED OF 24 CORNERS, INCLUDING MANY COMBINATIONS, BUT ONLY 15 OF THOSE REQUIRE THE BRAKE PEDAL. UNLESS YOU'RE EXPERIENCING AN "OFF."





VOLKSWAGEN GOLF R 3:12.3

BASE PRICE: \$39,910 • AS-TESTED PRICE: \$39,910
292 HP • 3416 LB • 11.7 LB/HP

Part hot-hatch overlord, part luxury-car pretender, the Volkswagen Golf R is both a GTI on 'roids and an Audi S3 after a coupon. Based on VW's MQB architecture, all three cars lap a track with similar competence and mien. The chassis is defined by ample, safe understeer, but the Golf R acquits itself with tacky grip, fade-resistant brakes, and light and talkative steering.

Volkswagen repurposes the S3's 292-hp engine, dual-clutch transmission, and four-wheel-drive hardware in two-box form with a discount of \$3585, which grows by \$2495 if you forgo the adaptive dampers. The differences in driving behavior between the Golf R and the S3, however, are more nuanced than this parts sharing might suggest. While the Golf R holds a 30-pound weight advantage on the S3, it carries more of its mass on the front tires. That might explain why, from the driver's seat, the VW feels more prone to push in corners. The GPS traces reveal that in a lap around VIR, the Golf R cedes most of its one-second deficit to the S3 in small increments through the tightest and longest turns—Horse Shoe, Oak Tree, and Bitch.

Compared with the GTI, the R's four-wheel-drive advantage allows the driver to lean on the throttle earlier in turns, and an extra 72 horsepower means this super-Golf rockets away from each apex with an uncanny ferocity. The six-speed dual-clutch transmission ratchets through gears under acceleration, but it is slow to downshift under braking. On multiple occasions, the transmission only engaged the desired gear after our foot had already returned to the throttle, creating an awkward, momentum-killing hesitation. The fix: The Golf R with a proper manual transmission should be at dealerships by now.

Whether the Golf R passes your cost-benefit analysis depends on your frame of reference. The GTI offers a similar driving experience for thousands of dollars less. But contrast the Golf R with the S3 that has nearly identical specs, and the R looks like one of the best bargains on the market.

AUDI S3 3:11.3

BASE PRICE: \$43,495 • AS-TESTED PRICE: \$48,045
292 HP • 3446 LB • 11.8 LB/HP

What if we tell you that the Audi S3's lap renders the 2007 RS4 obsolete? Consider: The 292-hp S3 is but 0.1 second behind the 420-hp RS4 on VIR's 4.1-mile gantlet, and this despite going 6.9 mph slower down the front straight. Clearly the S3 has higher cornering speeds. If today's lowliest Audi S-car can match the hottest Audi sedan from

2007, a car that made our resident Porsche-ophile, Tony Quiroga, quip, "This is a car that makes me not want a 911," then we are definitely in the realm of greatness.

Most of the S3's one-second advantage over its platform-mate, the Golf R, is gained under braking. The four-wheel-drive S3 rotates with greater ease than its transverse engine and economy-car underpinnings suggest it might. It also outpaced the Golf R with better grip in some of VIR's longer bends. As far as we can tell, the only difference between the S3 and the Golf R is tires, and the Audi-spec Continental ContiSport-Contact 5Ps may be slightly better suited to VIR than the VW's Bridgestone Potenza RE050As.

Despite a modest weight to the linear steering, the helm isn't light on feedback. Understeer will take over, particularly if the driver is hard on the throttle before the car is pointed the right way. For best results, pilot the S3 as you would any front-drive car, with lots of patience and control, never manhandling it like you would the wannabe rally cars from Subaru or Mitsubishi. The Audi doesn't have the rear-end rotation that those cars supply under power.

Ask any group of racers if they would pay \$3585, the spread between the Golf R and the S3, to clip one second off their lap. Most would ask if \$7170 will get them two seconds. Meanwhile, the RS4, like many of our former Lightning Lap entries, glows bright in our memory but falls on the charts to the onslaught of progress. To wit: A 350-plus-hp RS3 is headed stateside soon.

EVEN PARENTS NEED TO STAY OUT OF TROUBLE.

Contrary to childhood opinion, parents don't have eyes in the back of their heads. But that doesn't mean your QX60 can't. Backup Collision Intervention is a world's first technology that intelligently senses what the driver may miss when backing up — and can even apply the brakes momentarily to avoid a collision. Because the easiest way to stay out of trouble, is to stay away from it.





The 2015 Infiniti QX60

Join us at InfinitiUSA.com/QX60



*BCI will not detect every object, and speed limitations apply. Always check surroundings and turn to look behind you before moving vehicle. See owner's manual for details.



ALFA ROMEO 4C

3:08.8

BASE PRICE: \$60,895 • AS-TESTED PRICE: \$69,445
237 HP • 2475 LB • 10.4 LB/HP

Few recent new cars have created as much excitement as the 4C, and rightfully so. It is a genuine carbon-fiber Italian exotic, a mid-engined mini-Ferrari with a spartan interior and a roughness around the edges. And it doesn't cost more than your house.

The lack of mechanical aids—it has unassisted steering and barely boosted brakes—translates into a rewarding track car. Get a corner wrong and your inner Enzo (like your id, only with better hair) wills you to do it smoother and quicker.

Curb serrations jackhammer the steering wheel, tugging at arm and shoulder muscles as you strain to work the Nautilus machine in your hands. This would be more enjoyable if the wheel's stitching didn't dig into your fingers. Some exotic-car owners wear gloves while handling their pride; in this car, second skins are a necessity.

The 4C's brake pedal is firmer than any other car's at this year's event, and it provides a workout, too. The car reacts to every ounce of force added to the pedal. Trail-brake into a corner and the rear rotates nicely; trail-brake too much and the otherwise-neutral chassis swaps ends, as we found out twice in Horse Shoe.

We were expecting slightly quicker lap times. Maybe it was the unmuffled exhaust

HOW THE PLASTIC STACKS UP

THE ALFA ROMEO 4C IS ONE OF ONLY FIVE CARS IN THE HISTORY OF LIGHTNING LAP WITH A CARBON-FIBER TUB. OF THOSE, IT'S BY FAR THE MOST AFFORDABLE AND DELIVERS THE MOST SPEED PER DOLLAR AT 128.4 MPH/\$100,000. IT'S POSSIBLY THE ONLY WAY THE 4C TRUMPS THE 918:

■ BASE PRICE
■ AVERAGE MPH
■ MPH/\$100,000

PORSCHE 918 SPYDER

\$847,975
90.5
10.7

LEXUS LFA

\$379,575
84.3
22.2

McLAREN 650S SPIDER

\$295,575
89.0
30.1

KTM X-BOW

\$78,000
84.2
107.9

ALFA ROMEO 4C

\$60,895
78.2
128.4

that is part of the sensory pummeling in this car, but after looking at some key specs (237 horsepower, 10.4 pounds per horsepower), the 3:08.8 time seemed right on target. The Alfa is practically tied—just 0.4 second quicker—with the 2006 Lotus Elise, which also saddled each of its horses with 10.4 pounds. The one feature notably missing from the Alfa is a limited-slip differential. Without it, the 4C's 1.7-liter turbo four spins the inner-rear wheel on VIR's slowest corners, such as Oak Tree and when exiting Spiral.

This car is tuned for ten-tenths drivers living ten-tenths lives. Doing anything less than going for it makes the heavy steering, bump steer, and rowdy, raspy engine feel like unacceptable burdens given the car's price at the top of our LL2 class. Porsches get it done with more refinement if less flair. Whether you think the Alfa is crude or a plastico fantastico, there isn't a cheaper way to take an Italian on a track date.

FORD MUSTANG GT

3:05.2

BASE PRICE: \$35,695 • AS-TESTED PRICE: \$42,975
435 HP • 3822 LB • 8.8 LB/HP

From the numbers, and if you don't count the new independent rear suspension, the reborn Mustang GT doesn't appear to be much different than its predecessor. Twenty-three horsepower separates the two, and while both ride on 19-inch Pirelli P Zero tires, the new Stang has a 255/275 stagger to the old car's square 255 fitment. Despite the new car's 196-pound weight gain, the two Mustangs are separated by just 1.1 mph on the front straight. So, where did the new car lop off 3.4 seconds?

The short answer is everywhere. Pick a corner, any corner. Fractions of time came from every sector. It's all due to the Mustang's stable chassis and the confidence it imparts. And that's true whether you choose the V-8 or the turbocharged four.

With a big V-8 riding over the front wheels, the handling of this Performance-package GT reminds us of the Mercedes-Benz E63 AMG S-model we lapped last year. Like the AMG, the Ford's large body leans ever so slightly in corners. The grip is good (0.93 g in Horse Shoe), the nose-heavy mass distribution slows turn-in speeds, and the brakes take all manner of abuse without

any fade. Get the front turned in and the car won't set a P Zero wrong. The tail will swing wide only if you provoke the Mustang with lots of throttle and at absolutely the wrong time.

Through the Climbing Esses the GT was quicker and posted a better time than the 2012 Mustang Boss 302 Laguna Seca. The average speed there even bested the Mercedes-AMG C63 S and both Cadillac ATS-Vs we have this year.

Despite normal readings from the oil and coolant gauges, we did experience a slight fade in power during our hot laps. The shifter also drew ire. Close gates make it easy to find fifth when you're looking for third. But mostly, the GT's polished performance makes us eager to try out the more powerful and track-focused GT350R.

CADILLAC ATS-V SEDAN

2:59.8

BASE PRICE: \$63,460 • AS-TESTED PRICE: \$64,545
464 HP • 3809 LB • 8.2 LB/HP

There are moments on the track when you'd swear that GM just went out and hired half the Le Mans grid for its development team. Really, the ATS-V sedan's chassis is that good. After rumbling out of the pits, you've got at least three solid laps of peak performance to extract your time. That may not sound like very many, but we've seen cars of much higher pedigree go soft after a lap or two. The Cadillac's tires and brakes—especially the brakes, those wonderful, unbreakable brakes—soak up the abuse with a shrug and keep going.

Entering the two spots on this circuit that often provoke peak frustration—the tight turns after the long straights—the ATS-V does its business with such expert

confidence that you're encouraged to push harder. Getting the car turned here is no problem, and there's no bawling fuss from the hardworking Michelins as you apply inputs through the fast steering. Lift the throttle if you must; the chassis tucks nicely in response to adjust your line. Your lips flash a smile.

Up out of the infield through the gentle macaroni-shaped lefts and rights, the ATS-V does an amazing impersonation of those German DTM racing sedans you've seen on YouTube, digesting curbs and drifting sideways at max grip toward the next apex. Sparks should be flying from underneath, the driver always certain of exactly how hard to push to make the corner. The ATS-V leaves nothing on the table, and both it and the ATS-V coupe beat the BMW M4 we tested at the last Lightning Lap by about a second.

Yes, we'd like a better interior and more back-seat space, but on a track those issues fade in importance. The ATS-V has got the goods. Huh, a Cadillac.



LEXUS RC F

3:05.8

BASE PRICE: \$69,475 • AS-TESTED PRICE: \$75,210
467 HP • 4069 LB • 8.7 LB/HP

Lexus's performance play is a sort of Japanese Camaro SS with a burly V-8 and lots of, um, flair in its styling. But clocks are blind, and our LL test is all about what a car will do against one. This heavy sports coupe wasn't as quick as some of its competitors, but it did three consecutive hot laps in three minutes and five seconds apiece. That's an impressively consistent performance—especially in hot southern weather—produced by having the right tires and brakes for the track. Those aren't attributes we've often observed in a Lexus.

Almost everywhere on VIR, the Lexus closely trails the Mustang GT, the nearest analogue to a Camaro in this test. Were it 200 pounds lighter like the Ford, the RC F might even have caught the Mustang. Simply put, the RC F goes as fast as this much power moving this much mass (4069 pounds—only the CTS-V is heavier) will allow. Which is praise indeed, because it



means the chassis is not getting in the way by being spooky or dull.

Sure, the RC F would be quicker if you could get it to turn at higher cornering speeds. It pulls 0.93 g in Horse Shoe, a so-so stat that indicates the understeer with which the driver is always grappling. In faster bends the car glues down and stays flat, its speed limited by the power available.

Lexus gives you lots of car modes to choose from, including an oh-so-Japanese “expert” chassis mode that sits above sport-plus. We ran in that with the stability control shut off and full manual control of the automatic transmission, which isn’t quite as intelligent as that in the ATS-V. One thing Lexus does absolutely right: an audible “beep” chirps to command an upshift. Because of it, we ignored the tach and never lost time to the rev limiter, something that can’t be said about most of the automatic-equipped cars here. Wired up and amply fleshed out, the RC F needs only a diet to be faster.



MERCEDES-AMG C63 S

2:59.2

BASE PRICE: \$80,775 • AS-TESTED PRICE: \$91,080
503 HP • 3949 LB • 7.9 LB/HP

For the past few years, Mercedes has sent along a man, Karl-Heinz Seitter, to mind its cars at Lightning Lap. He’s also become a kind of Mercedes-Benz team manager, gently prodding our drivers to do better. Tell him you got a 3:02 and he’ll ask you if three-flat is possible. Get the three-flat and he’ll have you chasing 2:59. We

love Karl-Heinz; it’s like having the great, globular *Rennleiter* Alfred Neubauer along, but without the gray serge and fedora.

We thought the C63 S had hit the temporal wall at just over three minutes, but Herr Seitter went to work, channeling the ghost of the big man. He had to move fast; the car spent a day fallow with a chewed accessory belt that was destroyed by a bad alternator. He thought this middle-sized AMG, with its roaring 4.0-liter twin-turbo V-8, could slip under three minutes, and we were obliged to try.

The issue is getting the car to turn and then putting down its prodigious power. After bombing the straight with a Vmax of almost 148 mph, the pipes blaring thrilling war whoops that echo off the pit suites, the C63 then demands saintly patience through the slow corners while its tires wrestle with nearly two angry tons of inertia.

On the fastest lap, they held against 0.98 g of lateral in Horse Shoe; the CTS-V tied for grip and only six cars posted higher numbers. At the exit, throttle discipline keeps the rear end in line as the 516-pound-

feet of torque seeks an outlet. Once the summer sun had warmed the track like a flatiron, the C63 was done, its brakes just fine but its tires no longer able to deliver.

Supportive buckets hold you in place, and the *blappity-blap* of the downshifts makes inspiring theater. Sweptback and smoothed over, this newly urbane C63 lacks some of the race-day brashness of the old C63, especially the slightly quicker Black Series coupe tested in 2013. Still, at 2:59.2, the new C63 S becomes the fastest four-door AMG we’ve tested. Seitter was smiling, but he’ll be back with more next year.

CADILLAC ATS-V COUPE

2:59.2

BASE PRICE: \$74,155 • AS-TESTED PRICE: \$76,950
464 HP • 3794 LB • 8.2 LB/HP

The coupe brings the same stunning competence to the task as the sedan, though it’s in the higher LL3 class (\$76,950 as tested!) mainly because of a \$6195 Track Performance package that includes a low-mass battery, the Performance Data Recorder video system, and a carbon-fiber aero kit that cuts top speed on the straight by about 3 mph. Even so, the coupe and sedan are in all but a dead heat around the circuit. The coupe clipped a few tenths in Horse Shoe and up through the infield, then gave back a little of it in Hog Pen. Call it driver variation, track temperatures, whatever; to the clock, the coupe was effectively the same car minus a couple of doors.

Which means it is fabulous, a thrilling revelation. GM gives you a number of driving modes, and we found that leaving the transmission in automatic and setting the Performance Traction Management to level five—the so-called race mode—gave the best performance. Any automaker that can program electronics to be this natural understands the racer’s challenges.

The transmission knows exactly which gear to be in and when. If you paddle-shift it, you must keep one eye on the tach lest you run into the rev limiter and blow off the boost (and ruin the lap). Manual shifting may give the fingers something to do, but when you’re chasing tenths, it’s best to leave the ratio changing to the microchips.

The ATS-V’s traction management is also finely honed. Exiting a corner you just mat it and let the computer lock the throttle onto the sweet spot between grip and fishtail. Engines with big turbos are sensitive; they reward the steadiest of right feet. If you lift even a little, you don’t just lose revs, you lose the boost that helped make

FAST FOUR-DOORS:
THIS YEAR’S CROP BRINGS
OUR SEDAN AND
FOUR-DOOR HATCH COUNT
TO 52. THE C63 S
WOULD HAVE BEEN THE
QUICKEST ON RECORD IF IT
WEREN’T FOR THE CAR ON
THE NEXT PAGE.



them, and it's a long recovery process. Spool time is why jet jocks are trained to think ahead of their engines.

So, you can try to lap without the computer's help, but diddle the gas pedal, as you might unintentionally from the car's sliding around, and the lap time suffers. In the ATS-V, the computer acts as a buffer to filter out your mistakes and lets you be you, a fallible human. And it goes where no BMW has gone before: below three minutes.

CADILLAC CTS-V 2:56.8

BASE PRICE: \$87,290 • AS-TESTED PRICE: \$97,985
640 HP • 4114 LB • 6.4 LB/HP

Some things, while physically possible, just shouldn't be done. For example: flushing a public toilet with anything other than your shoe, driving a cargo van to pick up your prom date, or drinking a Skinnygirl Margarita at a football tailgate. You can add lapping a 4114-pound sedan at VIR in 2:56.8 to the list. Big sedans aren't supposed to corner this fast; inhaling highway without compressing spinal discs over bumps is their prime directive. Yet GM's ultrasedan does it all, sticking an all-American pin into the balloon of German dominance in this genre.

When Cadillac says it built the CTS-V for the track, it isn't kidding. In our all-time LL rankings, the CTS-V's lap slots 0.9 second behind the 2011 911 GT3 RS and 0.6 quicker than the '06 Dodge Viper SRT10. That's heady company for any car. The "four-door Corvette" moniker has never been more fitting, at least in the track context.

With 640 horsepower and less downforce than some of the quicker cars this

A GAME OF HORSE SHOES

TURN 1

ROADHOLDING IN HORSE SHOE (G):

• CHEVROLET CORVETTE Z06	1.20
• LAMBORGHINI HURACÁN LP610-4	1.13
• McLAREN 650S SPIDER	1.06
• MERCEDES-AMG GT S	1.05
• PORSCHE 911 GT3	1.05
• CADILLAC ATS-V COUPE	1.03
• CADILLAC CTS-V	0.98
• MERCEDES-AMG C63 S	0.98
• ALFA ROMEO 4C	0.97
• CADILLAC ATS-V SEDAN	0.96
• FORD MUSTANG GT	0.93
• LEXUS RC F	0.93
• VOLKSWAGEN GTI	0.93
• MAZDA MX-5 MIATA CLUB	0.92
• VOLKSWAGEN GOLF R	0.91
• AUDI S3	0.88
• FORD MUSTANG ECOBOOST	0.87
• MINI COOPER HARDTOP JCW	0.85

GRIP IN THE FIRST CORNER, HORSE SHOE, IS SURPRISINGLY ANALOGOUS TO GRIP ON A 300-FOOT SKIDPAD. UNLIKE LAP TIMES OR GOLF SCORES, A LARGER G VALUE INDICATES THAT THE CAR IS GOING FASTER.



size becomes a secondary concern thanks to massive 15.4-inch front- and 14.4-inch rear-brake rotors. It isn't until you're cornering (at 0.98 g in Horse Shoe) that the V's sedan-ness is felt, literally. The sensitive areas surrounding your patella throb as you brace your leg against the door trim to keep your body on the seat and to maintain control of the car.

Struggling with the bracing makes left-foot braking particularly difficult, a shame because brake feel and balance are superb. We once went into Turn 11, just before Oak Tree, a little hot, and the back end gently stepped sideways. If it were abrupt or alarming, we wouldn't have confidently steered the car with brake modulation all the way through Oak Tree. But we did.

The automatic performed perfectly in drive. No need to activate the paddles here. And the Cadillac's brakes and powertrain are barely stressed from back-to-back-to-back laps. Unfortunately, we can't say the same of the tires.

Michelin Pilot Super Sports carried the CTS-V's two-plus tons with aplomb until they got greasy and lost a bit of grip at the limit. This made Hog Pen, the last in a string of many corners between straights, slippery. The car maintained respectable grip but just wasn't at its best in the last corner.

If a little understeer while hot is the worst thing we can say about this car, then we're confident that the four-door Lightning Lap title won't fall for some time.



CHEVROLET CORVETTE Z06

2:44.6

BASE PRICE: \$93,480 • AS-TESTED PRICE: \$100,245
650 HP • 3550 LB • 5.5 LB/HP

Seconds before the Corvette Z06 crosses the start-finish line to begin its hot lap, you're subjected to 1.20 g's of lateral acceleration for six full seconds through Hog Pen. A silence falls over the switchboard in your head. Every neuron lines up to get the Z06 moving through space as quickly as possible. Gone are the employment doubts, the mortgage-payment anxieties, and the hair-thinning concerns that clutter up your daily thoughts—domestic worry is not possible at 1.20 g's. Belt into a Z06 with the Z07 package like this one and the automotive-induced enlightenment lasts exactly 2:44.6.

This isn't a peaceful, monk-on-a-moun-

tain experience, though. It's like being caught inside your own personal earthquake. And in 100-degree heat, as we don't run power-robbing A/C while lapping. Did we mention that you have one chance to perfectly execute a quick lap before the fresh \$2200 set of Michelin Pilot Sport Cup 2 tires lose their maximum potential?

It's not until the lap ends that the steering comes across as heavy. Or that you realize that the brake pedal needs a mildly excessive amount of travel before biting. Or that you've sweat through your antiperspirant. Still, this Corvette is exactly right. There's simply no understeer anywhere, with grip of 1.20 g's or more in several corners. Tall gearing—second is good for 93 mph—means that you can get on the throttle earlier in the slow corners without the fear of lighting up the tires. It's as if this car exists solely for Lightning Lap.

Carbon-fiber feathers cover the body—not for flying, but to keep the car grounded. Gurney flaps, spoilers, and splitters push the car into the tarmac and make the impossible possible. You can, for example, accelerate through the last half of the Climbing Esses, which eats the speed of lesser cars. In the Z06 you enter at 134.8 mph, average 128.4 mph, and leave going 122.6 mph while cornering at 1.47 g's. That's a drop of just 12 mph versus the McLaren's 34-mph speed loss. Imagine tripling the speed most people drive on a freeway on-ramp and you'll have an idea of what it's like to drive a Z06 through those esses. Even a supercar like the Lamborghini Huracán can't hang with the Vette there; one of us tried it and ended up mowing a Lamborghini-wide fairway through the grass.

With big downforce comes big drag. Even marshaling 650 horsepower, we could

Q&A: Jim Mero



Corvette ride-and-handling engineer Jim Mero knows a thing or three about putting down a fast lap. Watch him attack the Nürburgring in a C6 ZR1 on YouTube if you don't believe us. During his 11 years working on the Corvette, he estimates that he has done more than 15,000 laps on tracks all over the world. One of those laps happened to last a mind-numbing two minutes and forty-one seconds at VIR while he was behind the wheel of a new Z06.

Corvette PR sent him to babysit the Z06 while we lapped, so we asked him a few questions between runs:

C/D: What's the difference between Lightning Lap and renting the track for development?

JM: Everything. During Lightning Lap you have about 20 laps with any given car to get a fast lap. We typically spend several days at a track during our development trips, so I probably had 80 laps in the Z06 before I cut a fast lap. And we naturally choose a time when the conditions are as good as possible.

C/D: Over the years, the

weather has been fairly consistent for our Lightning Lap tests. How do ambient conditions affect lap time, power, and tires?

JM: We were lucky to have perfect weather for our fast lap. It was sunny, dry, and about 45 degrees. Charged engines absolutely love colder ambient temps, and the Michelin Pilot Sport Cup 2 tires have no problem achieving grip at these temperatures. [Compared with your runs,] the conditions for our 2:41.3 lap were easily 1.5 to 2.0 seconds faster.

C/D: How many hero laps do the Cup 2s have in them?

JM: The Cup 2 tires are bred from race compounds, and like any race tire their best grip is probably in the first two laps of a typical track, or one lap at the Nürburgring. With consecutive laps, the pressures and temperatures build, so you expect some loss in grip. That said, I've run hundreds of tanks of fuel through the Z06, and grip at the end of the tank is still outstanding.

C/D: When will we get a 'Ring time for the Z06?

JM: It's complicated. [Nürburgring officials recently instituted speed limits in certain portions of the track, effectively outlawing lap-record runs.]

C/D: What do you think about Lightning Lap? Are we slow?

JM: Having to drive a variety of cars with different dynamics, trying to achieve a representative lap time, the pressure is tremendous. The C/D drivers have my sincere respect. And the times they achieve given the circumstances are completely admirable. Very few people can move from car to car and achieve these kind of times.

C/D: We'll let Altermann know. Can a front-engine car get any better?

JM: The front-engine car can always get better.

C/D: How much better will the mid-engined Vette be?

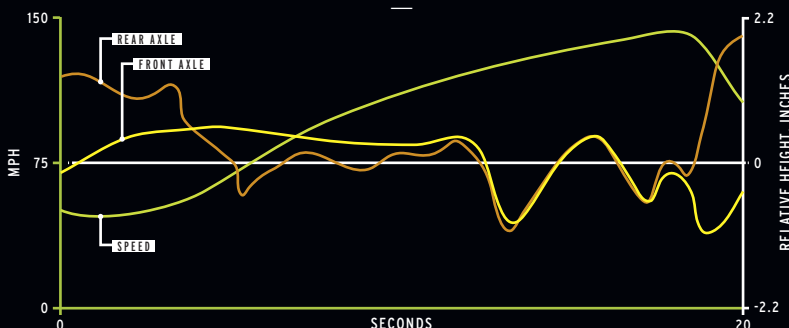
JM: You are some funny dudes.

WIRE TAP

OUR TEST GEAR, THE RACELOGIC VBOX 3i, CAN RECORD DATA FROM A CAR'S CAN (CONTROLLER AREA NETWORK) BUS CONCURRENTLY WITH ITS 100-HZ GPS INFORMATION, ENGINE RPM, WHEEL SPEEDS, STEERING ANGLE, ACCELERATOR POSITION, AND EVEN VERTICAL WHEEL POSITIONS ARE ALL ON THE BUS. UNFORTUNATELY, EVERY CAR IS DIFFERENT AND THE VARIOUS CHANNELS ARE ENCRYPTED, SO WE CAN'T RECORD EVERYTHING ON EVERY CAR. YET. SEE BELOW AND PAGE 064 FOR A COMPLETE DATAGASM.



MAY THE DOWNFORCE BE WITH YOU



Downforce is a drag, man. The vertical-wheel-position information recorded on our data file reveals speed-sucking downforce at work. As the Z06 accelerates down the Grand West Course's back straight, the difference between the front- and rear-wheel positions shrinks. In other words, the tall wickerbill-equipped spoiler on the Z06's tail increases rear tire loading with speed, driving the body closer to the ground. At 145 mph, the rear of the car is more than an inch lower than the Z06's static height. The spike in the rear-height trace at the end of the straight shows the car pitching forward, the result of load transfer during braking.

only hit 153.5 mph on the long straight. Wind resistance, attributable to and commensurate with the downforce produced, is so extreme that the act of shifting from fourth to fifth eats 1.3 mph. Think about that: The brief lift off the throttle during the shift is a 0.3-g braking event, which is about how much stopping power most drivers use on the street. Fortunately, the seven-speed gearbox accepts ridiculously quick shifts. On the back straight, from clutch in to clutch out, the shift from third to fourth takes 0.4 second.

Going 4.1 miles in 2 minutes and 44.6 seconds means an average speed of 89.7 mph. That's higher than any speed limit in the land. As you might imagine, driving at road speeds is seriously boring after a fast lap in this car. For the full charts-and-graphs analysis of how the Z06 beats a legit supercar around VIR, turn to page 064.



MERCEDES-AMG GT S 2:51.0

BASE PRICE: \$142,375 • AS-TESTED PRICE: \$171,900
503 HP • 3698 LB • 7.4 LB/HP

Of all the surprises at Lightning Lap this year, the AMG GT S ranks at the very top. We'd previously driven AMG's new sports car at Mazda Raceway Laguna Seca and left feeling that the car was capable but a bit cold to the touch. It struck us as a car that relied more on brute mechanical grip than

handling finesse. First impressions aren't always right, however. The GT S's 2:51.0 lap alone is worthy of amazement, but what shocked us more was how much fun we had in AMG's latest sports car.

With the 4.0-liter V-8 tucked way back behind the front wheels, the GT S carries 52.7 percent of its 3698 pounds on its rear wheels. The turn-in grip is phenomenal. Some of that magic is likely due to the \$2600 P71 Dynamic Plus package that tightens the chassis and adds negative camber to the front tires. P71 offers a choice of Michelins at no extra cost: Pilot Super Sports or Pilot Sport Cup 2s. Our car arrived with the maxi-grip Cup 2s that were good for 1.05 g's of gum-in-your-hair stickiness in Horse Shoe.

The chassis shines in the technical parts of the track. Directional changes are met with stability and grip, and yet the car reads as small and nimble. Every degree of steering is faithfully followed, and the Alcantara rim tells tales the Michelin Men need you to hear, which is especially important in the long, rhythmic corners of the infield where throttle and steering battle for control.

The power builds smoothly and with the linearity of a naturally aspirated engine. The 503-hp V-8 doesn't surge, which makes it easier to dial up the right amount of power to the rear wheels. Plus, shifts from the seven-speed dual-clutch are smooth and quick enough not to disturb the car's balance. Consequently, the AMG can put the horses down safely in long corners such as



WHERE THE RUBBER MEETS THE STRASSE:

THE NÜRBURGRING

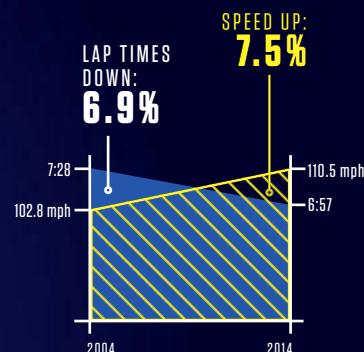
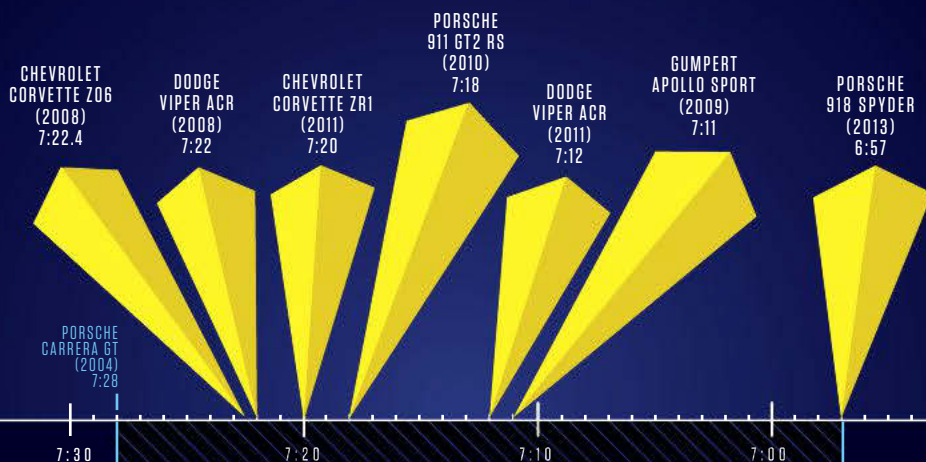
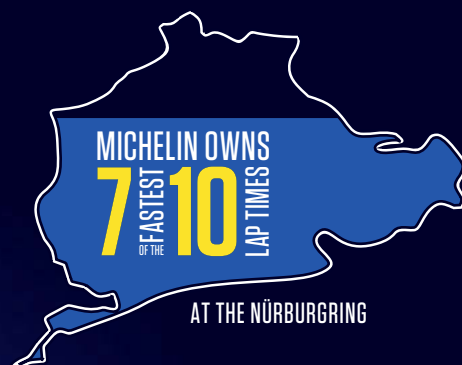


The world of motorsports has tracks of all lengths, layouts, conditions and climates, but there is only one gold standard: Germany's Nürburgring. In an industry where speed claims and lap times can become white noise, the Nürburgring Nordschleife stands alone. It's a 12.9-mile gut check of grueling turns and unending straightaways. A place where the elite automotive wheat is separated from the jalopy chaff.

And while many cars have taken turns owning the record lap times, one name in tires rises above the rest: Michelin. Michelin's goal isn't just to land on the top of these leaderboards; it's simply the outcome of intense research and development, track testing and decades of experience — on and off the track. It's Michelin's passion for driving performance that started 126 years ago and still fuels them today.

The world's elite automotive engineers demand nothing less than tires that deliver superior acceleration, braking and handling. It's no wonder they choose to partner with Michelin time and time again when they're fitting the greatest cars in the world to tackle its greatest track.

With over 100 years of performance, Michelin continues to shape the future of the tire industry. Learn more about our latest breakthrough at www.michelinman.com/pilot



SINCE 2004, MICHELIN HAS HELPED ITS PARTNER MANUFACTURERS SHAVE 31 SECONDS OFF THE RING LAP RECORD.

HELPING THE FASTEST BRANDS IN THE WORLD PERFORM AGAINST THE CLOCK.



LATE-BRAKING NEWS:
BOTH OF THIS YEAR'S LL4
CARS WORE CERAMIC
BRAKE ROTORS,
ADDING \$9210 TO THE
PORSCHÉ AND \$8950
TO THE MERCEDES.

ONWARD WE CLIMB

THE CLIMBING ESSES

CLIMBING ESSES AVERAGE SPEED (MPH):

• McLAREN 650S SPIDER	129.4
• CHEVROLET CORVETTE Z06	128.4
• MERCEDES-AMG GT S	124.1
• PORSCHE 911 GT3	122.9
• CADILLAC CTS-V	122.2
• LAMBORGHINI HURACÁN LP610-4	120.4
• FORD MUSTANG GT	116.7
• CADILLAC ATS-V COUPE	116.1
• CADILLAC ATS-V SEDAN	115.9
• LEXUS RC F	115.3
• MERCEDES-AMG C63 S	114.9
• AUDI S3	112.9
• MINI COOPER HARDTOP JCW	110.2
• ALFA ROMEO 4C	109.9
• VOLKSWAGEN GOLF R	109.1
• VOLKSWAGEN GTI	107.7
• FORD MUSTANG ECOBOOST	107.4
• MAZDA MX-5 MIATA CLUB	103.0

A COMBINATION OF ROLLER-COASTER WHOOPS AND A GATED SLALOM, THIS SEQUENCE OF FOUR CORNERS LOOKS EASY ON A MAP, BUT IT'S HUGELY INTIMIDATING FROM THE DRIVER'S SEAT. A HIGH AVERAGE SPEED REQUIRES A CAR TO REMAIN PLANTED UNDER RAPID SIDE-TO-SIDE LOADINGS. NOTE: THE McLAREN'S ASSAULT ON THE ESSES IS A NEW LIGHTNING LAP RECORD.

Hog Pen, the sweeping right-hander before the front straight. A high exit speed out of that turn—the AMG's 107.3-mph exit was only bested by cars that lapped VIR in the 2:40s—provides a long run at the straight where the GT S hit 154.7 mph. Only the McLaren and the Lamborghini went faster there this year.

For our fast lap we shut off stability

control and turned the console-mounted knob to race mode, which locks the gearbox, suspension, steering, and electronic differential into their quickest and most aggressive modes. We did dial the suspension back to the middle setting to get back some suppleness, as the GT S leaps and bounces alarmingly over the curbing in the stiffest setting.

Power and handling are equally represented here. Which one wins is up to the driver. That's the joy of this car; both the engine and the chassis try desperately to win hearts and minds. It's fun to be the swing vote in the battle for car control.

PORSCHE 911 GT3 2:50.4

BASE PRICE: \$141,605 • AS-TESTED PRICE: \$162,010
475 HP • 3327 LB • 7.0 LB/HP

Someone inevitably asks: Which one is your favorite? In this field of dreams, it's impossible to pick one. But if we had to drive one car as fast as possible for an entire tank of gas, it'd be hard to choose anything but the Porsche 911 GT3.

Racetracks make tires hot and greasy, force brake pedals to drop unceremoniously to the floor, and pitch temp needles into the red. But not in the GT3. It's the same car, lap after hot lap.

The GT3's apparent lack of mechanical stress instills in the driver a sense of trust and relaxation. Porsche's carbon-ceramic brakes feel impervious to heat, and the engine shrieks all the way to 9000 rpm again and again. Each shift from the dual-

clutch gearbox is a muffled gunshot, and the steering is the best we've touched in a long time. It telegraphs exactly what is happening at the front tires and almost feels unassisted in its clarity and feedback. Yep, if we had to lap a track for 24 hours in France, we'd pick this car to do it in.

Performance degradation only affects the tires. The Dunlop Sport Maxx Race rubber gives 100 percent in the first few hot laps, but after that, the tires settle in and provide a steady 95 percent or so of grip. We did our quick run after about one and a half warm-up laps on fresh tires. A good warm-up is necessary, as we were reminded once, when the charging Lamborghini Huracán bore down on the still-cold GT3, which promptly spun as its driver hurried to get out of the way.

With max grip in attendance, the GT3 posted a 2:50.4. That time makes this gonzo 911 the quickest sub-500-hp car we've tested and 11th best in our Lightning Lap hall of fame. Everything ahead of it enjoys a superior power-to-weight ratio.

Consistency and predictable handling, not raw power, are what put the GT3 near the top in every track sector. One particular highlight, likely due to the rear weight bias and the huge wing hanging off the back end, is its time through the Climbing Esses, where the GT3 hunkers down, grips, and gives you the confidence to floor the fear pedal. The result of getting on the throttle early is a staggering 118.4-mph exit speed, faster than the Huracán and the McLaren 650S.

In finding the limit, the driver once braked a bit too late on the back straight



Plug in and take names.

The all-new Audi A3 e-tron® plug-in hybrid is here.

It doesn't look like a hybrid. It certainly doesn't drive like a hybrid. And with its class-leading horsepower* and impressive 7.5 second 0-60 mph time, it's clear the Audi A3 e-tron delivers the unbridled power and performance to leave other hybrids in its wake. In other words, it's everything you'd expect from an Audi.



*Horsepower claim based on manufacturer published specifications. Class defined as the 2016 Audi A3 e-tron, 2015 BMW i3, 2015 Lexus CT, 2015 Chevrolet Volt, 2014 Honda Accord PHEV, 2015 Ford C-MAX, 2015 Nissan LEAF, 2015 Toyota Prius and the 2015 Mercedes-Benz B-Class ED. "Audi," "e-tron," "Truth in Engineering," all model names, and the four rings logo are registered trademarks of AUDI AG. ©2015 Audi of America, Inc.



and just missed the turn-in point for the hard right named Bitch. Not a major event, but a rock or some debris sliced through a radiator fitting under the front bumper. Temps stayed normal, even after a couple more laps, and nobody noticed anything awry until a small pool of coolant formed under the car after we parked it. Fixed with some parts airmailed in from Porsche HQ in Atlanta, the GT3 played through the pain, just like a pro.



LAMBORGHINI HURACÁN LP610-4 2:47.5

BASE PRICE: \$255,720 • AS-TESTED PRICE: \$274,120
602 HP • 3431 LB • 5.7 LB/HP

Lamborghini's replacement for its chiseled Gallardo was the third-fastest car we had ever tested at Lightning Lap, behind only the Porsche 918 Spyder and Mosler MT900S. Well, that was on Day One anyway.

As the days passed, however, other cars got quicker while the Huracán stayed right in its slot, eventually only picking up a second or so to land at 2:47.5, still the quickest time for any Lamborghini we've ever lapped. Lesson? This is a car that doesn't keep you at arm's length or make you nervous; you're wringing out its best very soon after making first introductions.

It is loud, lyrical, and just a bit animal-like compared with the other cars here. It is, after all, a Lamborghini, and in this test by far the most powerful car lacking forced induction. Lord, what a heavenly bawl that V-10 makes at 8000 rpm. But the car welcomes you into its den of frenzy, which, despite all the drama, is actually a very comfortable, safe place to be. The controls are well placed, natural, and alive, and the fixed buckets—tight-fitting \$7210 Alcantara-over-concrete jobs—lock you smartly into the workstation. You're not trying to steer while also bench-pressing yourself against 1.13 g's of cornering force in Horse Shoe, for example.

Through all the sectors, the Lamborghini remained third quickest except through the infield, where it moved up to second. We suspect the four-wheel drive

THE CORNER BAKERY

INFIELD

INFIELD AVERAGE SPEED (MPH):

• CHEVROLET CORVETTE Z06	84.5
• LAMBORGHINI HURACÁN LP610-4	82.9
• PORSCHE 911 GT3	80.9
• McLAREN 650S SPIDER	80.7
• MERCEDES-AMG GT S	79.1
• CADILLAC ATS-V COUPE	77.8
• CADILLAC ATS-V SEDAN	76.6
• CADILLAC CTS-V	76.4
• MERCEDES-AMG C63 S	76.2
• LEXUS RC F	75.3
• ALFA ROMEO 4C	74.6
• FORD MUSTANG GT	73.6
• VOLKSWAGEN GTI	73.3
• AUDI S3	72.5
• VOLKSWAGEN GOLF R	72.1
• MAZDA MX-5 MIATA CLUB	71.9
• FORD MUSTANG ECOBOOST	71.7
• MINI COOPER HARDTOP JCW	70.4

EVEN WITH THE TENACIOUS GRIP FROM ITS FOUR-WHEEL DRIVE, THE HURACÁN CAN'T TOP THE Z06'S RECORD THROUGH THESE CONSTANT-RADIUS CORNERS.



helped give it some extra dig over the McLaren in the fast left-right-left-right series of sweepers coming out of the track's lowlands. Everywhere it went, the Huracán solidly connected, braking and turning without complaint and sticking in corners like pavement striping. It may not have set the best time of the week, but it is the best Lamborghini, both in terms of performance and usability, that we've ever driven.

MCLAREN 650S SPIDER 2:45.8

BASE PRICE: \$295,575 • AS-TESTED PRICE: \$353,115
641 HP • 3276 LB • 5.1 LB/HP

The McLaren 650S Spider is this rodeo's unbroken bronc, fighting its rider for the prize with every explosive move. It takes time to learn its behavior and nuances, but eventually the horse and rider come together for a spectacular show.

Totally fine with us; only an idiot would complain about too much time in this British heartthrob so at home on a track. A carbon-fiber tub and other composite pieces keep the curb weight under 3300 pounds. The one-piece seat swaddles your body, eliminating the need for any secondary bracing. Controlling the systems are buttons for the gearbox and a pair of dials for the powertrain and supple hydropneumatic suspension. Set the dials to "T," for track, and tap the "active" button. That's all. It's ready to run.

Thanks to a 641-hp, twin-turbo V-8 wailing to 8500 rpm, finding speed on straights isn't a problem, though we struggled with understeer and braking during warm-up laps. An odd soft spot in the brake pedal's travel indicated, to us at least, that the ABS was past its optimal operating pressure. It was only after talking with the McLaren techs—one Italian by heritage, the other by birth—that we learned that the brakes had more to give.

Push through the soft spot and the pedal firms up like an adolescent after a reprimanding. As the air brake snaps up, instantly blocking the rear view, the car wiggles slightly. It averaged -1.30 g's in repeated decelerations, a gut-churning stat that means you can hang it out longer before braking, going up to 162.8 mph on the front straight.

A corner follows every braking event. And in these corners the 650S can't hang

IN TRACK MODE, THE 650S'S REAR WING PITCHES UP TO 32 DEGREES TO PROVIDE DOWNFORCE. UNDER BRAKING, IT SNAPS TO 69 DEGREES, INCREASING DRAG TO AUGMENT DECELERATION.

with a fully baked Corvette. While the McLaren, wearing optional P Zero Trofeo Rs, is good for 1.06 g's in Horse Shoe, the Zo6 barrels through pulling 1.20 g's. The driver, sawing at the wheel, fights for every last bit of front-end grip in the 650S. In the Zo6, grip is a given.

Narrow 235-wide front tires combined with wide 305 rears explain the lack of lateral stick. This aggressive stagger means the rear has much more grip in corners than the front. You can engage the throttle earlier, but you have to be going slower to get the car turned. This requires a different approach in some corners. In Bitch, for example, a double-apex line was quicker than a single apex, despite having a lower minimum speed.

Early throttle application means the

McLaren can use its superior pounds-per-horsepower ratio, too. On every straight, the 650S leapfrogs the Zo6, blowing past it into the esses and on the back straight. It isn't until the beginning of the infield that the Zo6 takes the lead and, without another straight left in the lap, stays there [see pages 064–065]. The 650S gives up 1.2 seconds between this climbing section of long sweepers and the descent in sector five. The Huracán makes some time here, too, but not nearly enough to catch the McLaren.

While it may not have beaten the Chevy today, this is the first McLaren we've lapped, and with a 2:45.8, it's the third-fastest car in Lightning Lap history. A podium on your first outing is nothing to turn up a nose at, especially when your ride's more than four seconds quicker than another renowned stallion, the Ferrari 458.

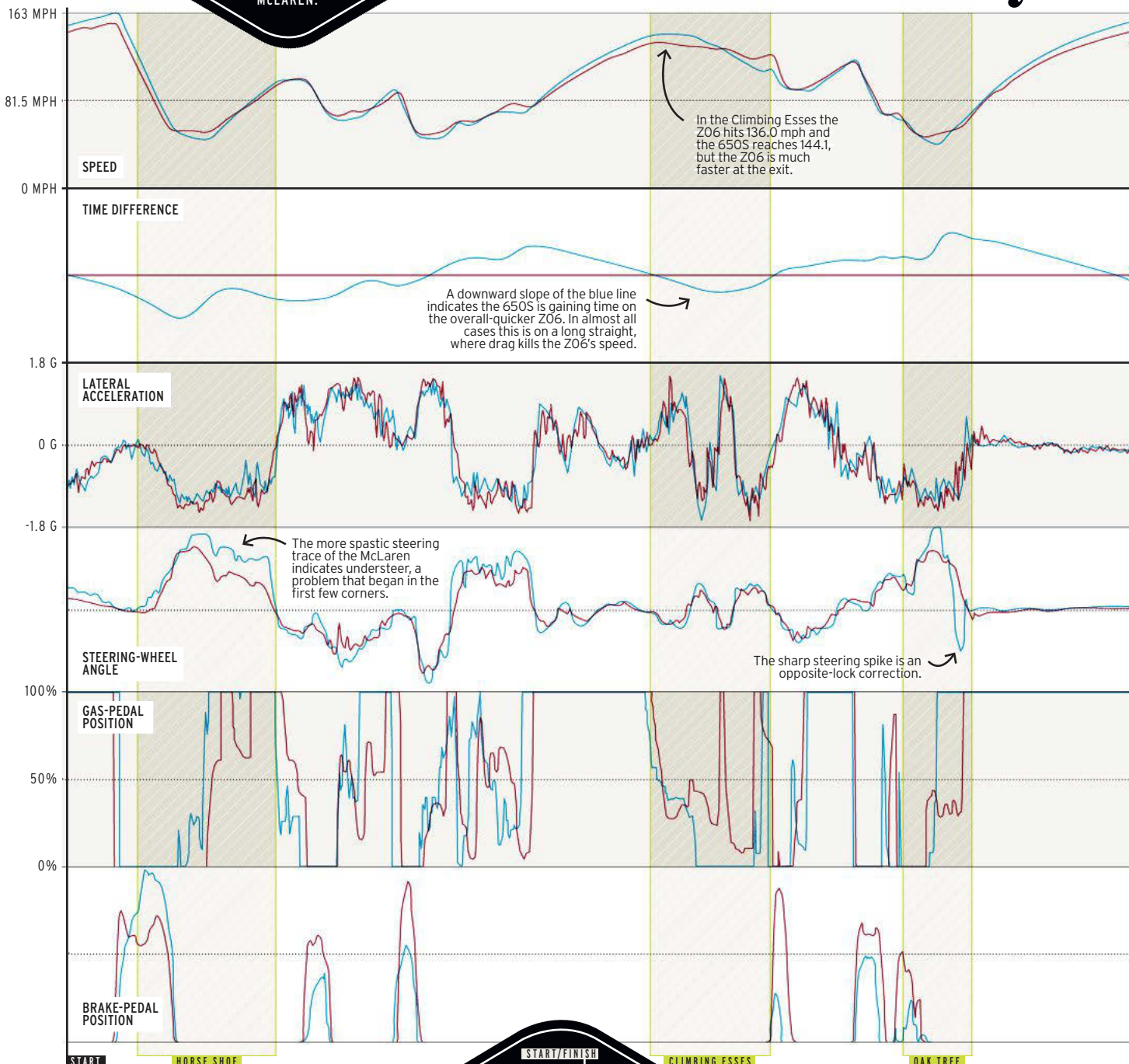




A LOOK AT DETAILED LAP DATA FROM THE Z06 (RED LINES) AND THE 650S SPIDER (BLUE LINES) REVEALS HOW AND WHERE THE CHEVY BETTERS THE THREE-TIMES-COSTLIER McLAREN.

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McLaren vs. Chevy:



HORSE SHOE

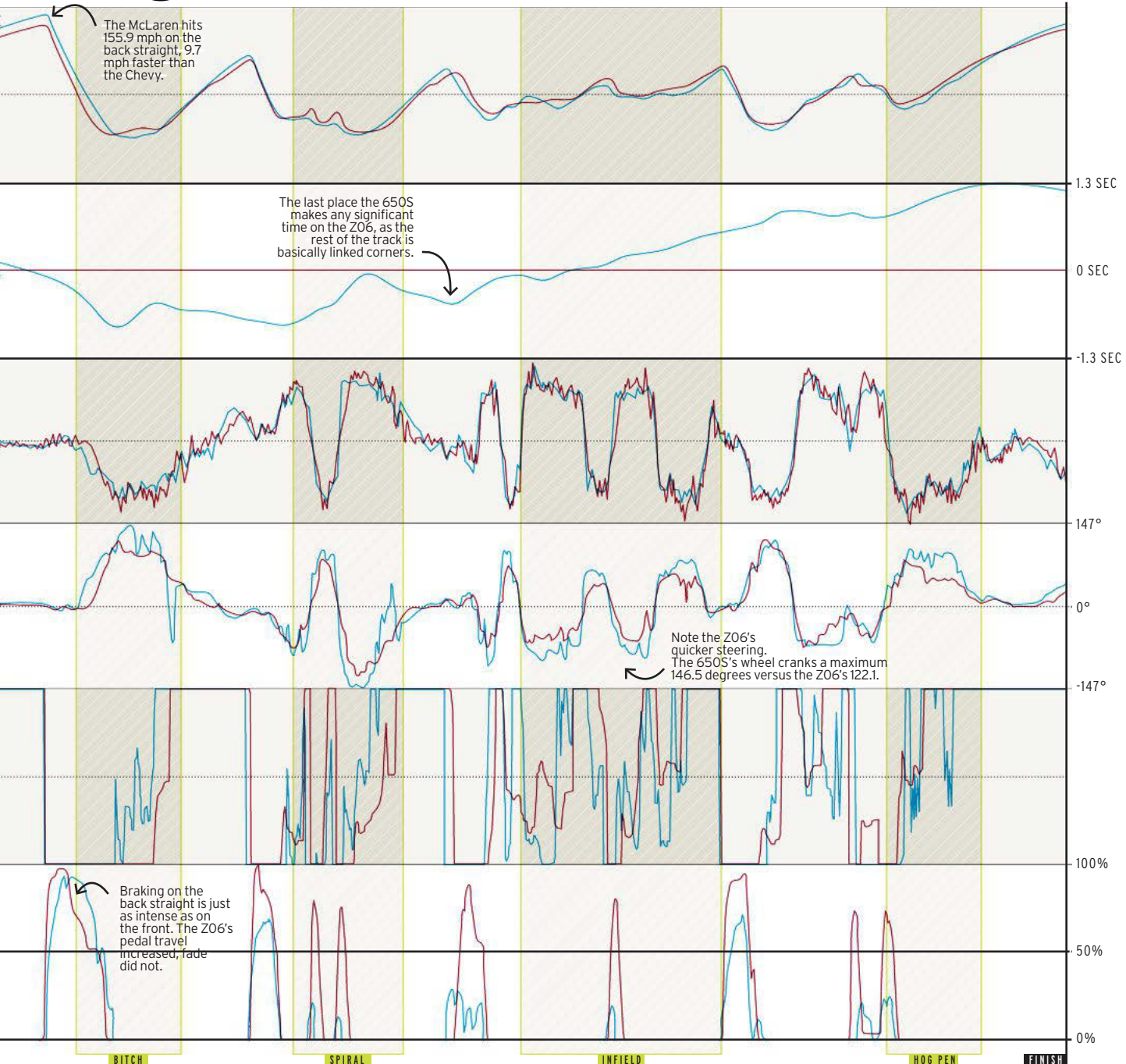
Both the Z06 and the 650S initiate braking at about the same mark, where the McLaren is traveling 9.3 mph faster. After turn-in, the Z06 makes up some of the time lost on the front straight with its greater grip. It doesn't look like a lot, but all the area between the blue and red lateral-acceleration traces amounts to about half a second in the Z06's favor. Getting to full throttle about 50 feet earlier—and staying on it—keeps the McLaren in the fight. The difference in the brake-pedal amplitude isn't an indication that the Z06 was soft on braking, just that its pedal had less travel. The waviness in the McLaren's steering is an indication that the driver was hunting for front-axle grip, meaning the car was usually in a state of understeer.



OAK TREE

Heading down the hill to the southern tip of the track, the Z06 has a slight lead. Oak Tree illustrates how greater speed through corners improves lap times. Indeed, Red Bull had four very successful years in Formula 1 using this approach. The Z06 pummels the 650S through Oak Tree, with a minimum speed (47.7 mph) that's about 8 mph quicker, netting four-tenths of a second in the process. By the end of the back straight, though, the Z06 has lost 1.5 seconds and is 0.9 second behind the 650S. McLaren is early on the throttle again, but a bit of oversteer shows up at corner exit. The Z06's steering is smoother, as if it's navigating a parking lot, not a racetrack.

Digital Lines in the Sand



BITCH

With the Z06's brakes up to temp, the pedal travels a little farther than it did in Turn One. Pulling more g's for a longer duration equates to another 0.4-second gain for the Z06. With a lower minimum speed, the McLaren double-apexes Bitch, trailing deeper on the brakes, hunting for grip.

SPIRAL

The two cars are pretty even through this four-story descent. Apologies for droning on like a CNN ticker, but the Chevy carries more speed through the corners. The McLaren slows down more to turn, but it apexes a little later and is on the throttle earlier. The McLaren takes the lead for the last time on the upcoming mini straight.

INFELD

On the 2200-foot section that runs west, the Chevy picks up nine-tenths of a second. Four long skidpadlike turns hammer the tires, and the Corvette's Michelins do a better job of holding the road than the 650S's Pirellis. The Vette's quicker steering is very apparent here.

HOG PEN

Both cars' tires have fallen off their maximum potential by the last corner, which prompts some driver hesitation in returning to wide-open throttle. The McLaren driver has to lift a bit midcorner to avoid sliding off the track. The 10 seconds the Z06 spends going up to 7 mph faster than the 650S translates to a 0.5-second advantage.

THE FINISH LINE

Just before the checkered flag, the 650S's lighter weight takes over and it nibbles away some of the Z06's lead gained in the last quarter of the lap. Final times: Corvette, 2:44.6; 650S, 2:45.8. Many claim VIR is a horsepower track. That's true for the Full configuration, but handling and horsepower are equally important on the Grand West layout. The finishing order might be reversed on a different track that favored straight-line power over grip. The fact that Grand West really favors neither makes it a great yardstick for all vehicles, which is precisely why we use it for Lightning Lap.



OVERALL RESULTS

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These are the quickest lap times for the 180 cars we've tested throughout Lightning Lap's nine-year run. Each car is color-coded by class and labeled with its overall rank. We've graphed them by their lap times (on the x-axis) and base prices with performance-enhancing options (y-axis) for a sense of each car's VIR-centric bang per buck. Those that fall below the black trend line are better values than those located above it. The clear winner is the 2015 Chevrolet Corvette Z06, with a lap time some \$250,000 below the trend line.

class key ~

LL1

LL2

LL3

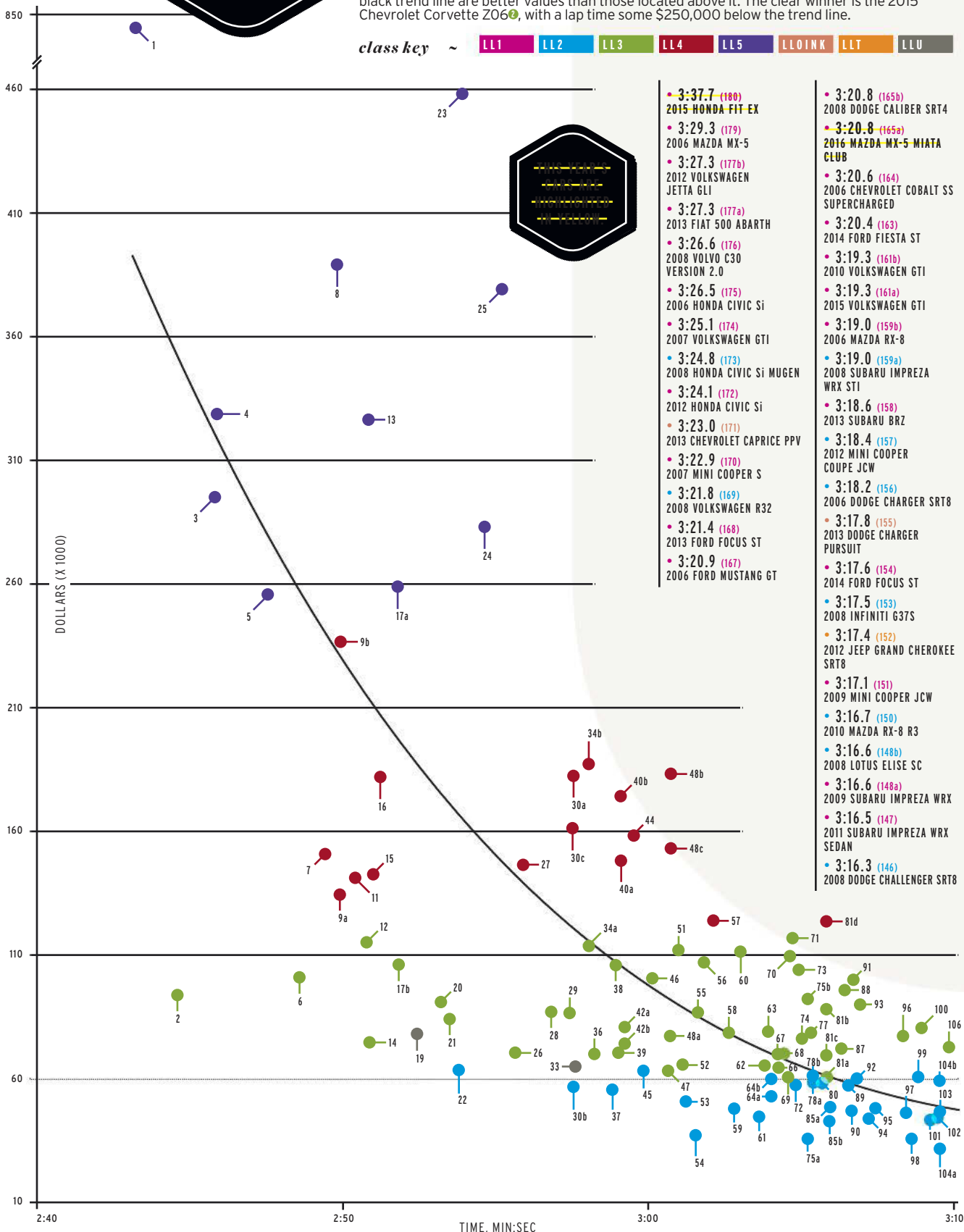
LL4

LL5

LLOINK

LLT

LLU



• 3:16.2 (145)
2010 MAZDASPEED 3

• 3:16.0 (144)
2007 MAZDASPEED 3

• 3:15.7 (143)
2007 PONTIAC SOLSTICE GXP

• 3:15.6 (142)
2015 FORD MUSTANG ECOBOOST

• 3:15.5 (141)
2015 SUBARU WRX

• 3:15.4 (140)
2015 MINI COOPER HARDTOP JOHN COOPER WORKS

• 3:15.0 (139)
2008 HONDA S2000 CR

• 3:14.8 (138)
2010 HYUNDAI GENESIS COUPE 3.8

• 3:14.6 (136b)
2008 AUDI S5

• 3:14.6 (136a)
2015 VOLKSWAGEN GTI

• 3:14.0 (134b)
2008 LEXUS IS F

• 3:14.0 (134a)
2012 VOLKSWAGEN GOLF R

• 3:13.9 (133)
2013 HYUNDAI GENESIS COUPE 3.8 R-SPEC

• 3:13.8 (130c)
2011 HYUNDAI GENESIS COUPE 3.8 R-SPEC

• 3:13.8 (130b)
2011 SUBARU IMPREZA WRX STI SEDAN

• 3:13.8 (130a)
2012 BMW 335is

• 3:13.7 (129)
2008 BMW 135i

• 3:13.5 (128)
2006 MITSUBISHI LANCER EVOLUTION MR

• 3:13.4 (127)
2014 LEXUS IS350 F SPORT

• 3:13.3 (125b)
2008 MITSUBISHI LANCER EVOLUTION MR

• 3:13.3 (125a)
2010 FORD MUSTANG GT

• 3:13.2 (124)
2012 BMW 335i SPORT LINE

• 3:13.0 (123)
2008 CHEVROLET COBALT SS

• 3:12.5 (121b)
2006 NISSAN 350Z TRACK

• 3:12.5 (121a)
2011 FORD MUSTANG V-6

• 3:12.3 (120)
2015 VOLKSWAGEN GOLF R

• 3:12.0 (119)
2009 NISSAN 370Z NISMO

• 3:11.7 (118)
2007 BMW Z4 M COUPE

• 3:11.3 (117)
2015 AUDI S3

• 3:11.2 (116)
2007 AUDI RS4

• 3:11.1 (115)
2012 BMW X5 M

• 3:11.0 (114)
2007 FORD SHELBY GT500

• 3:10.8 (113)
2010 AUDI S4

• 3:10.6 (112)
2010 MITSUBISHI LANCER EVOLUTION SE

• 3:10.5 (110b)
2007 BMW 335i COUPE

• 3:10.5 (110a)
2015 SUBARU WRX STI

• 3:10.4 (109)
2012 BMW Z4 sDRIVE35is

• 3:10.1 (108)
2012 DODGE CHARGER SRT8

• 3:10.0 (107)
2006 BMW M6

• 3:09.8 (106)
2013 AUDI S6

• 3:09.5 (104b)
2006 PORSCHE CAYMAN S

• 3:09.5 (104a)
2010 CHEVROLET CAMARO SS

• 3:09.4 (103)
2012 DODGE CHALLENGER SRT8 392

• 3:09.3 (102)
2006 CHEVROLET CORVETTE Z51

• 3:09.2 (101)
2006 LOTUS ELISE

• 3:08.9 (100)
2011 JAGUAR XFR

• 3:08.8 (99)
2015 ALFA ROMEO 4C

• 3:08.6 (98)
2011 FORD MUSTANG GT

• 3:08.4 (97)
2009 AUDI TTS

• 3:08.3 (96)
2011 LOTUS EVORA

• 3:07.4 (95)
2010 FORD SHELBY GT500

• 3:07.2 (94)
2014 BMW M235i

• 3:06.9 (93)
2011 MERCEDES-BENZ E63 AMG

• 3:06.8 (92)
2014 CADILLAC CTS VSPORT

• 3:06.7 (91)
2014 JAGUAR XFR-S

• 3:06.6 (90)
2011 BMW 1-SERIES M

• 3:06.5 (89)
2008 MERCEDES-BENZ C63 AMG

• 3:06.4 (88)
2010 JAGUAR XKR

• 3:06.3 (87)
2012 MERCEDES-BENZ C63 AMG COUPE

• 3:05.9 (85b)
2007 FORD SHELBY GT500

• 3:05.9 (85a)
2014 MERCEDES-BENZ CLA45 AMG

• 3:05.8 (81d)
2007 PORSCHE 911 TURBO

• 3:05.8 (81c)
2009 PORSCHE CAYMAN S

• 3:05.8 (81b)
2009 PORSCHE 911 CARRERA S

• 3:05.8 (81a)
2015 LEXUS RC-F

• 3:05.6 (80)
2008 BMW M3

• 3:05.4 (78b)
2009 BMW M3

• 3:05.4 (78a)
2011 LEXUS IS F

• 3:05.3 (77)
2012 LOTUS EVORA S

• 3:05.2 (75b)
2013 BMW M5

• 3:05.2 (75a)
2015 FORD MUSTANG GT

• 3:05.0 (74)
2009 LOTUS EXIGE S 260 SPORT

• 3:04.9 (73)
2012 MERCEDES-BENZ CLS63 AMG

• 3:04.8 (72)
2012 AUDI TT RS

• 3:04.7 (71)
2013 BMW M6

• 3:04.6 (70)
2007 AUDI R8

• 3:04.5 (69)
2007 LOTUS EXIGE S

• 3:04.3 (68)
2013 AUDI RS5

• 3:04.2 (67)
2011 CADILLAC CTS-V COUPE

• 3:04.2 (66)
2013 PORSCHE BOXSTER S

• 3:04.0 (64b)
2009 CADILLAC CTS-V

• 3:04.0 (64a)
2011 FORD SHELBY GT500

• 3:03.9 (63)
2012 PORSCHE CAYMAN R

• 3:03.8 (62)
2011 PORSCHE BOXSTER SPYDER

• 3:03.6 (61)
2007 CHEVROLET CORVETTE Z51

• 3:03.0 (60)
2014 AUDI RS7

• 3:02.8 (59)
2012 FORD MUSTANG BOSS 302 LAGUNA SECA

• 3:02.6 (58)
2014 PORSCHE CAYMAN S

• 3:02.1 (57)
2013 JAGUAR XKR-S

• 3:01.8 (56)
2007 PORSCHE 911 GT3

• 3:01.6 (55)
2006 DODGE VIPER SRT10 COUPE

• 3:01.5 (54)
2013 CHEVROLET CAMARO SS 1LE

• 3:01.2 (53)
2008 CHEVROLET CORVETTE Z51

• 3:01.1 (52)
2006 CHEVROLET CORVETTE Z06

• 3:01.0 (51)
2015 JAGUAR F-TYPE R COUPE

• 3:00.7 (48c)
2006 FORD GT

• 3:00.7 (48b)
2012 PORSCHE PANAMERA TURBO S

• 3:00.7 (48a)
2015 BMW M4

• 3:00.6 (47)
2013 FORD SHELBY GT500

• 3:00.1 (46)
2014 MERCEDES-BENZ E63 AMG S-MODEL

• 2:59.8 (45)
2015 CADILLAC ATS-V SEDAN

• 2:59.5 (44)
2010 AUDI R8 5.2 FSI QUATTRO

• 2:59.2 (42b)
2015 CADILLAC ATS-V COUPE

• 2:59.2 (42a)
2015 MERCEDES-AMG C63 S

• 2:59.1 (40b)
2014 JAGUAR XKR-S GT

• 2:59.1 (40a)
2014 MERCEDES-BENZ SL63 AMG

• 2:59.0 (39)
2009 NISSAN GT-R (ALL-SEASON TIRES)

• 2:58.9 (38)
2013 PORSCHE 911 CARRERA S

• 2:58.8 (37)
2010 CHEVROLET CORVETTE GRAND SPORT

• 2:58.2 (36)
2007 CHEVROLET CORVETTE Z06

• 2:58.0 (34b)
2011 MERCEDES-BENZ SLS AMG

• 2:58.0 (34a)
2012 MERCEDES-BENZ C63 AMG BLACK SERIES

• 2:57.6 (33)
2009 ARIEL ATOM 3

• 2:57.5 (30c)
2011 PORSCHE 911 TURBO S

• 2:57.5 (30b)
2013 CHEVROLET CAMARO Z11

• 2:57.5 (30a)
2014 AUDI R8 V-10 PLUS

• 2:57.4 (29)
2008 DODGE VIPER SRT10

• 2:56.8 (28)
2016 CADILLAC CTS-V

• 2:55.9 (27)
2011 PORSCHE 911 GT3 RS

• 2:55.6 (26)
2009 NISSAN GT-R

• 2:55.1 (25)
2012 LEXUS LFA

• 2:54.6 (24)
2008 FERRARI 430 SCUDERIA

• 2:53.9 (23)
2010 LAMBORGHINI MURCIELAGO LP670-4 SV

• 2:53.8 (22)
2014 CHEVROLET CORVETTE STINGRAY

• 2:53.5 (21)
2011 CHEVROLET CORVETTE Z06

• 2:53.2 (20)
2012 NISSAN GT-R

• 2:52.3 (19)
2009 KTM X-BOW

• 2:51.8 (17b)
2009 CHEVROLET CORVETTE ZR1

• 2:51.8 (17a)
2010 LAMBORGHINI GALLARDO LP570-4 SUPERLEGGERA

• 2:51.2 (16)
2014 PORSCHE 911 TURBO S

• 2:51.0 (15)
2016 MERCEDES-AMG GT-S

• 2:50.9 (14)
2015 CHEVROLET CAMARO Z/28

• 2:50.8 (13)
2014 FERRARI F12BERLINETTA

• 2:50.7 (12)
2012 CHEVROLET CORVETTE ZR1

• 2:50.4 (11)
2015 PORSCHE 911 GT3

• 2:49.9 (9b)
2012 FERRARI 458 ITALIA

• 2:49.9 (9a)
2014 SRT VIPER TA

• 2:49.8 (8)
2012 MOSLER PHOTON

• 2:49.4 (7)
2015 NISSAN GT-R NISMO

• 2:48.6 (6)
2008 DODGE VIPER SRT10 ACR COUPE

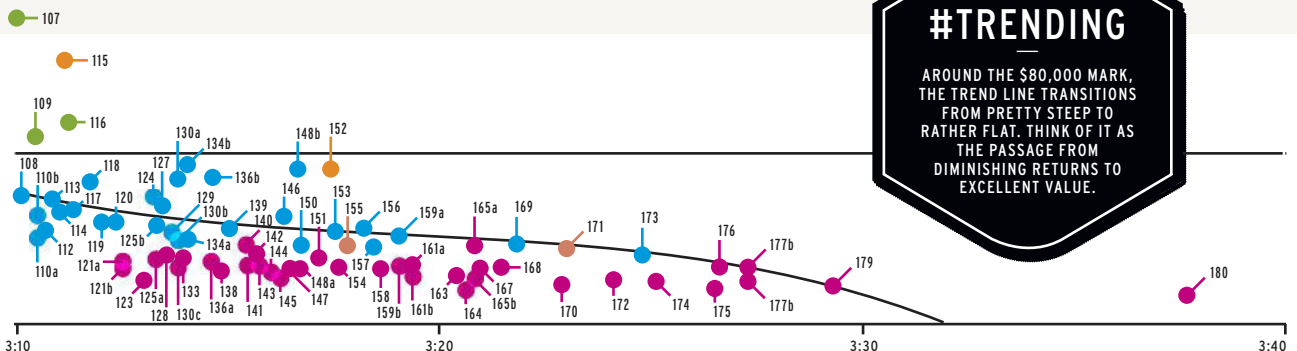
• 2:47.5 (5)
2015 LAMBORGHINI HURACAN LP610-4

• 2:45.9 (4)
2009 MOSLER MT900S

• 2:45.8 (3)
2015 McLAREN 650S SPIDER

• 2:44.6 (2)
2015 CHEVROLET CORVETTE Z06

• 2:43.1 (1)
2015 PORSCHE 918 SPYDER





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UTILITY PLAYER

THE GAS-ELECTRIC VOLT, NOW QUICKER
AND LESS ECCENTRIC, IS THE EMBODIMENT OF
NEW AGE VERSATILITY.

by AARON ROBINSON / *photography by* ROY RITCHIE



We have only fond memories of the original Chevy Volt, that slab-sided toccata and fugue of Yankee ingenuity from 2011. It looked like something Jimmy Carter acolytes created after locking themselves in a bunker with a Commodore PET computer, the Tupperware collection for 1981, and a laserdisc of the movie *Tron*. But the Volt worked, delivering both electric-vehicle stealth and internal-combustion freedom. It may have missed the energy crises for which it was perfectly suited, but its timing was still propitious. The 77,000 or so units that Chevy sold, the majority in California, thoroughly expunged the mark of Cain borne by General Motors ever since it was accused of killing the electric car.

The Volt II proves that GM's novel idea for an enviro-hybrid has cleared the tower of experimentation and is on full-powered ascent into a regular product line with a history and a sus-

taining business case. Could we finally see the Volt give birth to a family of vehicles—at least, besides a Cadillac coupe? Given the public's current fascination with small crossovers, surely GM must have a little SUVolt in the works.

Either way, the new Volt's styling makes a 30-year thematic leap to contemporary windswept sensuality, and the interior is no longer something out of the Apple catalog c. 1999. The silly touch-sensitive capacitive controls are gone, replaced by a mosaic of conventional push buttons set in a pleasingly organic fan of interior plastics and complemented by an elegantly integrated infotainment screen.

No doubt some *Voltifosi* will lament the car's reach toward design normalcy, toward looking a lot more like a Honda Civic. But the car both looks and functions a lot better, especially since GM makes a terrific effort to

CHEVROLET VOLT



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cater the car's controls to the needs of EV buyers and especially their hypermiling radical elite. And Volt lovers can rejoice that the basic four-door-hatchback envelope is essentially unchanged, with just about a half-inch inserted in the wheelbase and 3.3 inches added overall, mainly for styling and to give rear-seat passengers a little more legroom. Indeed, the frontal area and claimed drag coefficient of 0.28 are essentially as they were before.

While the car grows, its weight shrinks, our loaded Premier tester tallying 3396 pounds against 3766 for our last Volt test car. That triumph means the Volt effectively eliminates the mass gap with its arch rival, the Toyota Prius plug-in, and greatly narrows it against the regular Prius. Much of the Volt's excess cottage cheese came off the electric drive unit (99 pounds) and battery pack (31 pounds), which is where the most-profound changes to Volt II are found.

GM's marching orders from its customers were clear: Give us more range in EV mode, make the engine quieter, and give the car more driving spunk. The old powertrain, which paired an iron-block 1.4-liter four-cylinder to one large propulsion/regen motor/generator and one smaller multi-purpose electric machine, got a complete rethink. Now, a more powerful Atkinson-cycle 1.5-liter aluminum-block engine works in concert with two smaller motor/generators, housed inside a transaxle to drive the differential through a chain rather than gears as before.

Engineers studied a range of engines, from a 1.0-liter turbo three-cylinder to the 1.5, and selected the largest because of a fact that Corvette owners have long known: A bigger engine turning more slowly can be remarkably efficient. And quiet. And



↑ Top: The new Volt has an interior that looks like a car interior (and a nice one) instead of a soon-to-be laughably outdated gadget.

quicker, if need be, since the bigger engine doesn't need to call on the motors as much when the driver floors it. The long, 86.6-millimeter (3.41-inch) stroke makes the Volt's lump a sort of automotive tugboat engine, a low-speed torque machine with its 101 horsepower arriving at just 5600 rpm.

A T-shaped battery pack still lies under the tall center tunnel, but its capacity climbs from 17.1 kWh to 18.4, with fewer but larger liquid-cooled prismatic lithium-ion cells to generate more power from a lighter but slightly larger package.

The new transaxle houses two electric motors with 31 percent less combined power and 28 percent less torque than before, three clutches, and two planetary gearsets. Five propulsion modes are available. As long as energy is available from the battery pack, the Volt drives on one or both electric motors. When the charge is depleted, one of the motors cranks the engine to begin extended-range opera-

tion. Manipulating the clutches provides three distinct ranges for accelerating, cruising, and high-speed driving, with the motor/generators participating in propulsion and battery-charging roles. As in the original Volt, the electric motors also charge the battery during deceleration (regen).

Chevy claims a 19-percent reduction in the zero-to-30-mph time; that jibes with our measurement of 2.6 seconds for the new car versus 3.2 seconds before. The old Volt took 8.8 seconds to hit 60; the new Volt takes 7.8 seconds. The original was said to provide around 40 miles of electric driving; Volt II comes with a 53-mile claim. In two complete drains of the battery during normal driving, we saw 52 and 56 miles. Unfortunately, GM wouldn't leave the car with us long enough to get a thorough fuel-economy test. Further testing to follow at a later date, but, as you know, the Volt doesn't yield a simple fuel-economy number because it depends entirely on the way you operate it.

Drive it less than 50 miles per day and recharge overnight, as most Volt owners do (actually, 41 miles per day is the average, says GM), and the 87-octane gas in the tank will just slosh around unused, the engine nothing more than a couple hundred pounds of dead weight. Unless you com-



mand it to do otherwise, the Volt runs on electric power until it depletes the usable portion of the battery, and then seamlessly switches to a combination of gasoline and electricity. We did manage to get in a 120-mile run in this combined engine/electric mode with mixed traffic and road types, and it yielded a Prius-like 48 mpg.

Suffice it to say, the Volt is thrifty. It's also livelier, with a strong pull from a prodded gas pedal, and has reliable brakes and accurate if not thrilling steering. The Michelin Energy Saver tires supply quiet and adequate grip, but only to a fairly low threshold of 0.80 g. Bank robbers won't be looking here.

As promised, the Volt is quiet even with the plugs firing, unless you really draw the battery down by, say, running nine successive quarter-miles, or by climbing a mountain. When it needs to run hard, the 1.5 buzzes with labored effort, a noise especially apparent when you come to a red light. Most engines are at their quietest then, but the Volt's can be cranking away in a frenzy, charging the battery. It's one of the peculiar idiosyncrasies of this powertrain, but GM claims that the Volt II falls into these charging holes less often than Volt I, so it's a rarer occasion. At its highest speeds, the engine vibrations in our early test car found something sympathetic in the body to rattle, producing a clattery duet.

You can tell that GM closely studied the way EV drivers operate their vehicles. It's all about energy management, and Volt II gives you lots of control. For example, the four driving modes include normal, sport, and mountain, which cuts the EV-only range to preserve the battery for expected

long climbs, plus hold, which lets you save the battery for whenever you want EV miles. Those modes carry over from the gen-one Volt, but even handier is a new regen paddle on the back of the steering wheel, which turns a clunky hypermiling technique done with the shifter in many EVs into a simple fingertip function. Most EVs offer some kind of max-regen mode, but you usually have to shift into low or "B" to engage it, then shift back to D for normal acceleration. The Volt makes it much easier. The paddle only works when you lift off the gas, engaging maximum regeneration. In many daily situations, the paddle cuts the car's speed enough to provide all the deceleration you need and it will even stop the car completely. Which means the friction brakes, those energy-squandering devices from the smokestack era, can be used less often in favor of the paddle, which pours electrons back into the battery.

The rest of the cockpit has its share of plain black plastic but is laid out with pleasing hints at pseudo-grandeur. Mercedes could take a lesson from the artful integration of the central touch screen into the dash. Apple CarPlay was working on our car with an iPhone, though, as we've already reported ["Apple vs. Android," September 2015], the functionality is limited.

The driver's instruments are displayed on another multi-color screen with four selectable configurations (though really two with two minor variations of each). Nothing from the old Volt's display is carried



over, and the navigation map can now be echoed in a small window below the speedometer, though, without a separate zoom function. Rear-seat riders will have to duck under the sloping roof to enter. Chevy now fits a middle seatbelt but adds no legroom, so the necessarily short person there must straddle the battery as if riding a Shetland pony.

Chevy offers the Volt in two trims, the base starting at \$33,995 and our Premier—with leather seats, Bose stereo, and heated front and rear seats—starting at \$38,345. Get the various safety packages and you're over \$40,000, which means you could alternatively be driving something from a German luxury brand. The Volt, however, even in its relatively voluptuous new body, plays to folks less motivated by crass materialism, even if their object of desire bears the same price.

CHEVROLET

VOLT

➤ Fresh shape, longer EV range, a regen paddle, quiet efficiency, big trunk.

➤ Less, uh, distinctive styling, rear middle seat is a joke, you can have a BMW.

➤ GM uses smarts to vault the Volt to the next level.



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★ NOTABLE HIGHLIGHTS

Even though combined power is the same as before, the new Volt is quicker because of its 10-percent lighter curb weight.

EXTERIOR DIMENSIONS

WHEELBASE	106.1 in
LENGTH	180.4 in
WIDTH	71.2 in
HEIGHT	56.4 in
FRONT TRACK	60.6 in
REAR TRACK	61.8 in
GROUND CLEARANCE	4.9 in

INTERIOR DIMENSIONS

SAE VOLUME	F: 52 cu ft R: 38 cu ft
TRUNK	11 cu ft

CHEVROLET VOLT PREMIER

▼ SPECIFICATIONS

PRICE	
AS TESTED	\$40,500
BASE	\$38,345

VEHICLE TYPE: front-engine, front-wheel-drive, 5-passenger, 4-door hatchback

OPTIONS: Driver Confidence package, \$1265; MyLink with navigation, \$495; metallic paint, \$395

STANDARD: power windows and locks, remote locking, cruise control, tilting and telescoping steering wheel

AUDIO SYSTEM: satellite radio; minijack, 2 USB, and Bluetooth-audio inputs; Apple CarPlay interface; 8 speakers

ENGINE

Atkinson-cycle inline-4, aluminum block and head

BORE X STROKE ... 2.90 x 3.41 in, 74.0 x 86.6 mm

DISPLACEMENT 91 cu in, 1490 cc

COMPRESSION RATIO 12.5:1

FUEL DELIVERY SYSTEM direct injection

VALVE GEAR: double overhead cams, 4 valves per cylinder, hydraulic lifters, variable intake- and exhaust-valve timing

REDLINE/FUEL CUTOFF N/A/5600 rpm

POWER 101 hp @ 5600 rpm

TORQUE 103 lb-ft @ 4300 rpm

MOTORS

2 synchronous permanent-magnet AC

POWER 64 hp and 117 hp

TORQUE 87 and 207 lb-ft

BATTERY PACK

lithium-ion, liquid cooled

CELL COUNT/CONSTRUCTION 192/prismatic

CAPACITY 18.4 kWh

DRIVETRAIN

TRANSMISSION continuously variable

automatic

FINAL-DRIVE RATIO 2.64:1

CHASSIS

unit construction

BODY MATERIAL: steel and aluminum stampings

STEERING

rack-and-pinion with variable electric power assist

RATIO 15.7:1

TURNS LOCK-TO-LOCK 3.0

TURNING CIRCLE CURB-TO-CURB 36.4 ft

SUSPENSION

F: ind, strut located by a control arm, coil springs, anti-roll bar

R: ind, trailing arm integral with a transverse member, coil springs

BRAKES

F: 10.9 x 1.0-in vented disc **R:** 10.4 x 0.4-in disc

STABILITY CONTROL fully defeatable, traction off

WHEELS AND TIRES

WHEEL SIZE/CONSTRUCTION 7.0 x 17/

cast aluminum

TIRES Michelin Energy Saver A/S

215/50R-17 91H M+S

▼ COMPETITORS

CHEVROLET VOLT (1.5-L I-4 + 2 AC MOTORS, 149 HP, CVT)

FORD C-MAX ENERGI (2.0-L I-4 + AC MOTOR, 188 HP, CVT)

HONDA ACCORD HYBRID

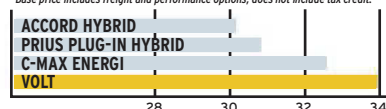
(2.0-L I-4 + AC MOTOR, 196 HP, DIRECT DRIVE)

TOYOTA PRIUS PLUG-IN HYBRID

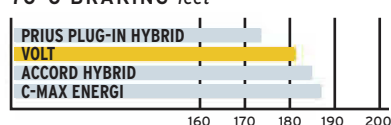
(1.8-L I-4 + AC MOTOR, 134 HP, CVT)

CURRENT BASE PRICE* dollars x 1000

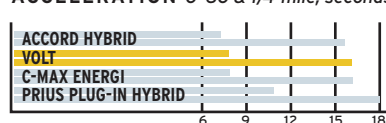
*Base price includes freight and performance options; does not include tax credit.



70-0 BRAKING feet

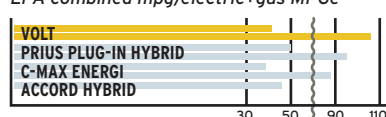


ACCELERATION 0-60 & 1/4-mile, seconds



FUEL ECONOMY

EPA combined mpg/electric+gas MPG



CAR AND DRIVER TEST RESULTS

ACCELERATION

ZERO TO	SECONDS
30 MPH	2.6
40 MPH	4.0
50 MPH	5.7
60 MPH	7.8
70 MPH	10.5
80 MPH	13.7
90 MPH	17.8
100 MPH	23.4
ROLLING START, 5-60 MPH	7.9 sec
TOP GEAR, 30-50 MPH	3.2 sec
TOP GEAR, 50-70 MPH	4.7 sec
1/4-MILE	16.1 sec @ 86 mph
TOP SPEED (GOV LTD)	101 mph

TEST NOTES: Brake-torque method does improve launch acceleration.

Battery wilts after a few max-effort acceleration runs.

HANDLING

ROADHOLDING, 300-FT-DIA SKIDPAD	0.80 g
UNDERSTEER	MINIMAL

TEST NOTES: Cool and predictable on the skidpad, though not very fast. Putting the battery weight down low minimizes body roll. The steering is light and the placement is accurate. Feels like a smaller car than it is.

BRAKING, 70-TO-ZERO MPH

FIRST STOP	182 ft
SHORTEST STOP	181 ft
LONGEST STOP	192 ft
FADE RATING	SLIGHT

TEST NOTES: The brakes stay in the game with a firm pedal after repeated hits, though the distance does stretch a little.

WEIGHT

CURB	3396 lb
PER HORSEPOWER	12.0 lb
DISTRIBUTION	F: 58.5% R: 41.5%
TOWING CAPACITY	0 lb

FUEL

CAPACITY	8.9 gal
OCTANE	87
EPA CITY/HWY (GAS ONLY)	43/42 mpg
EPA COMBINED (ELECTRIC ONLY)	106 MPGe

INTERIOR SOUND LEVEL

IDLE	37 dBA
FULL THROTTLE	65 dBA
70-MPH CRUISING	67 dBA

tested by AARON ROBINSON
in California City, California



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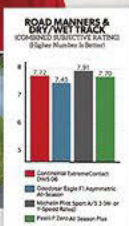


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1	Continental ExtremeContact	8.7	8.8	8.3	8.7	9.0	8.6	8.0	7.1	6.7	6.5	8,882,427		
2	Goodyear Eagle F1 Asymmetric	8.0	8.0	8.0	7.8	8.5	7.8	7.2	6.4	6.5	6.4	20,494,994		
3	Michelin Pilot Sport A/C2 235 or 255	7.5	7.5	7.6	8.0	8.5	8.1	8.6	7.8	8.3	7.0	6.9	3,138,419	
4	Goodyear Eagle F1 Asymmetric	7.0	7.3	7.2	8.4	8.1	8.7	8.6	8.6	8.2	7.7	8.0	4,176,057	
5	Continental ExtremeContact	7.2	7.2	7.1	8.0	7.2	6.9	5.4	5.0	7.1	6.6	6.8	5,905,953	
6	Goodyear Eagle F1 Asymmetric	6.7	6.7	6.7	7.4	6.9	7.6	5.9	5.2	4.6	7.4	6.9	7.2	16,982,250
7	Michelin Pilot Sport A/C2 235 or 255	6.4	6.4	6.4	7.2	7.7	7.4	5.5	4.8	4.8	7.4	6.8	5.5	267,830
8	Continental ExtremeContact	5.9	6.3	6.8	7.3	6.9	7.5	5.8	5.3	4.6	6.9	6.2	7.6	6,184,156
9	Goodyear Eagle F1 Asymmetric	5.4	5.4	5.4	6.2	7.0	6.3	4.8	3.8	3.9	6.6	6.3	5.8	241,500
10	Michelin Pilot Sport A/C2 235 or 255	5.0	5.0	5.7	6.3	6.3	6.7	4.2	3.2	3.2	6.7	7.7	6.0	454,360
11	Continental ExtremeContact	4.7	4.9	5.4	5.5	5.8	4.3	3.7	3.5	5.3	4.2	3.6	4.0	58,735,328
12	Goodyear Eagle F1 Asymmetric	4.0	4.0	4.0	4.0	4.0	4.0	3.0	3.0	3.0	3.0	3.0	3.0	3,531,966

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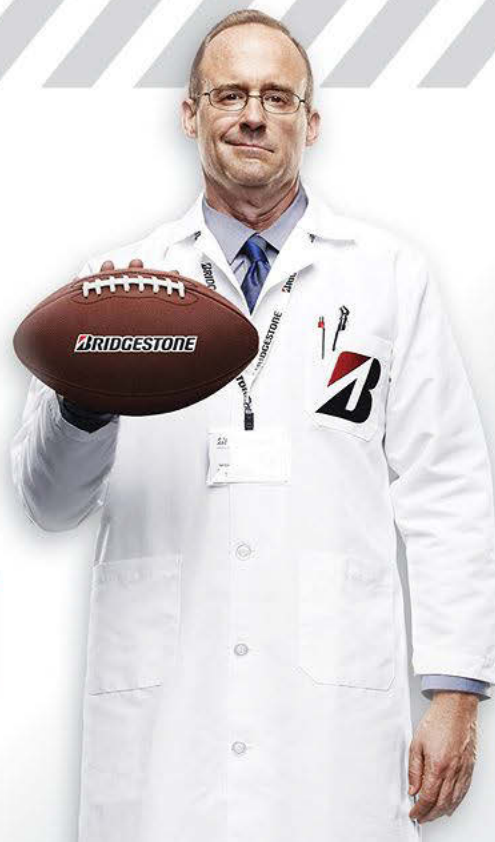
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ventus V12 evo²

Max Performance Summer⁺

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ventus S1 noble²

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A sophisticated asymmetric tread design features notched outboard shoulders, intermediate and center ribs to bring together impressive ultra high performance in dry and wet conditions with all-season traction in light snow.



***\$100** Mail-in Rebate with a set of four (4)

ventus S1 evo² SUV

Street/Sport Truck Summer⁺

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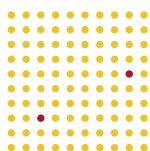
THE 20% SOLUTION

082

. feature

To the 43rd annual Van Nationals, where we discover what it takes to be a true 2-percenter.

by Daniel Pund
photography by Marc Urbano



“You all don’t look like vanners,” oozed the man wearing the patch-covered white lab coat and long gray beard, “you look more like . . . golfers.” This would prove to be the most succinct and truthful thing we would hear in two days of communing with the custom-van aficionados at the 43rd annual Van Nationals in a deeply muddy field, just outside of Altamont,

Illinois. And it was uttered less than an hour after our arrival. We were not fooling anyone.

We would later assuage ourselves by tallying only six rounds of golf between three of us. See? We’re no damn . . . golfers! But we surely were not vanners, either. None of our group wears a gray ponytail, and, trust us, we have totally unscientific anecdotal evidence to prove that there was a higher percentage of gray ponytails here among the vans and porta-potties and mud than there was at any one of this summer’s Grateful Dead farewell concerts.

None of us looks or speaks anything like P.R. Pete, the first person we laid eyes on when we entered this five-day truck-in scene. Further, we can acknowledge that Mr. P.R. (inexplicably standing for Public Relations) and his bleatings scared the living hell out of us. We couldn’t understand a word that man said.

Hell, not one of us even owns a beer koozie or a T-shirt with the words “ALWAYS SMELL

IT FIRST” printed on it. Further, we’d arrived in three European-designed cargo vans that, compared with the flowing expressive bodies of customized vans, looked like they were constructed entirely of big black-and-white Lego blocks. Even tucked away next to the fairgrounds’ harness-racing track, our HVAC-company vans couldn’t have stood out more if they were Ferrari 275GTBs.

Vanners are an insular sort. Their fantastical creations are generally frowned upon by car-show types, who, according to most of the vanners we talked to, are uptight and un-fun anyway.

Van-Ins, including this, the mother of all Van-Ins, are not open to the general public. This is not a show; it’s a gathering. That



← Left: Gary Larkin and his bottled-water-themed van. Opposite, clockwise: Coop and the Rat Fink-inspired Dodge; Joyce and Marty Sooby with Mo-Fo; Ed Beard Jr. and Dragon Lord.





↑ Top: We're pretty sure these two people were conspiring to achieve sexual congress in our IKEA furniture-filled van. Above: Red Stripe bar gathering and galoshes fashion show.

vanners share a planet with the dandies who attend the renowned Pebble Beach Concours is almost beyond comprehension. Vanners have their own code, though unlike the rigid decorum of other car events, the only things you need to attend the Van Nationals are a van, the \$65

entrance fee, and the ability to not be a complete buzzkill.

We could at least muster this level of van-itude. Oh, that's another thing: A prospective vanner is going to have to practice adding the word "van" to any word. "Have a van-tastic day," people will say with no apparent irony.

And these people revel in their anti-establishment, outsider status in the automotive realm. Judging by the number of vans that showed up at a typical Van Nationals over the past several years, the number of vanners is about a tenth of what it was in its mid-'70s heyday. The Van Nats of 40 years ago were genuine happenings, with up to 6000 vans boogieing in. And if period footage and addled memories are anything to go by, nobody was wearing a shirt back then. Nobody. It was a bacchanalian orgy lubricated by human grease and alcohol with a cloud of pot smoke above and shag carpeting below.

There's a reason why, back in the day, parents warned their daughters about dating a man with a van. Sometimes vanners would build a temporary city out of lumber in which to party for a few days and then burn the thing to the ground when they were done.

Longtime vanners wear their rowdiness and randiness as a badge of honor. If ever you buy a van and attend a Van-In, you will see "2%" stickers and patches plastered on everything. They originated in the mid-'70s when an organization called the National Street Van Association (NSVA) tried to bring order and sponsorship to the helter-skelter vanning scene. The organization and its leader wanted to tamp down the partying in hopes of drawing bigger crowds, or at least not scare away the families and sponsorship money. The partiers were characterized by the NSVA as the 2 percent of the vanning community that were ruining it for the others. This was, predictably, not well received by hard-core vanners, who claim to have not liked the corporate money-grubbing ways of the new organization. And, as veteran vanner Greg "Coop" Cooper noted, "The shitters were never cleaned out."

Well, the remaining vanners, with a heavy concentration in the Midwest, have remained vanners, and the NSVA went out of business decades ago. So now, virtually every vanner you meet identifies as a 2-percent. The hard core. The shirtlessness is now largely confined to graying menfolk. Because, as one vanner from southern Ohio said, "Gravity takes hold, you know."

Joe Madonia, who is setting up a 4000-



square-foot Museum of Vanning in Hudson, Florida, reckons: “The average age of vanners used to be 25. Now it’s 65. We used to take drugs to have fun, now we take them to stay alive.” The periodic clouds of freshly burned weed that waft around the fairgrounds indicate that lots of van-folk suffer from life-threatening glaucoma.

Madonia hopes that the Van Nationals makes it to its 50th anniversary, but he doubts that it’s going to make it another seven years. There just aren’t enough new vanners coming into the fold. There is a younger set, like the earnest and soft-spoken David “Matchstick” Brooks, 27, who produces a magazine called *Custom Vanner*. There’s a club from Ohio called Next Generation Vanners, made up of 20-somethings. The Vandoleros, from California, bring some fresh younger blood. And there’s Mike Lapoint, a 22-year-old guy from Windsor, Ontario, who has the look and pleasantly inebriated demeanor of a young Mick Jagger, but with a Canadian accent.

But there simply doesn’t seem to be enough of them to continue the tradition once the old guard is no longer able to make it. And with no new crop of attractive vans on the market, well, there won’t be a ready supply of raw materials, either. None of our vans appealed much to the collected masses. They’re ugly. They’re not distinctively American. They’re too expensive. A few passersby seemed to like our Sprinter, which we’d outfitted with \$500 worth of flat-pack IKEA furniture along with a saucy semi-nude print from Gustav Klimt. It’s possible that those people were just being nice. People were invariably nice, even to a curiosity like our crew.

But Van National attendees also have an outsized capacity for accepting different styles and tastes. Sure, there are vans with the prototypical quasi-mystical-broadsword-wielding-warrior-with-helpless-

↑ Above: There is no dark side of the moon, really. Matter of fact, it’s all dark. Right: Wooden wheels. Bottom: We like to imagine Funkadelic driving around in the Cosmic Cruiser.

damsel-wearing-a-bucksin-bikini murals. There are dragons and wizards, exemplified by the stunningly complex and obsessively detailed Dragon Lord van, which is a 2000 Dodge Ram Van expertly airbrushed by Ed Beard Jr. This thing reads like a visual fantasy novel. It would short-circuit the brains of prepubescent Dungeons & Dragons fans.

But there’s also a Pink Floyd *Dark Side of the Moon*-themed van. There’s a Jack Daniel’s-themed van. There’s a pirate-themed van featuring some sort of actual animal bones (found “down at the river”) crossed over the taillights. There is a *Finding Nemo*-themed van. An *Alice in Wonderland* van. Coop, who did some pinstriping on Ed Roth’s casket, has brought a beautifully fin-



ished, lime-green Rat Fink-themed shorty van. It started life as a 1970 Dodge A108 work van before Coop, who is wearing sunglasses with lime-green arms and has a green-tinted ponytail, chopped three feet out of the wheelbase.

And there's a ratted-out van owned by a kid from Tennessee who wears an equally ratty Black Flag T-shirt. There's the eight-wheel, superstretched, ramp-nosed Cosmic Cruiser that somehow made it through U.S. Customs from Canada. There are chopped vans and drag-racing vans and vans that are actually just junk.

It's fair to say you won't see variety like that at any car show. You also won't see anywhere near as much stained-glass decoration or wood trim as you do at the Van Nats. And probably not nearly as many people collected in one place with the sole purpose of having fun, no matter how much alcohol they have to consume in its pursuit.

And that is how it is that at something like 3 a.m., we might have stolen a drive in a four-row golf cart with about six unsuspecting folks aboard. It was ostensibly a security vehicle, doing rounds of the fairgrounds, with revelers onboard just going for a ride. We might have hooted. We definitely hit Vmax. We argued briefly with a woman who appeared to have taken a shine to one of our group and tried repeatedly (and, it must be said, semi-successfully) to force him to drink from her bottle of Chi Chi's Mexican Mudslide, a premade rum cocktail. She hollered something at us that we don't remember. But we do remember screaming back: "Dammit, woman! I have a navigator right here beside me. You are in no danger."

But only one of our group managed to stay up later than that. This would be the staffer who earlier tried to wash the dried mud off his legs in the toilet of a nearby McDonald's. At 4:30 a.m., he found himself at a karaoke party in the middle of one elaborate encampment where he consumed all that was offered to him. He felt he'd earned his 2% badge. The next day, he was somewhat less enthused about the experience and considered his vanning days over. The real vanners continued to party for another couple of days and nights. We drove home. No party can last forever. Sure was fun while it lasted, though.

RAM PROMASTER 1500 ECODIESEL

- ✦ It's the least expensive one.
- ✦ Poor steering, shoddy build quality, shame-inducing appearance, no handling, crude ride, criminally awful transmission . . . do we need to continue?
- The SadnessMaster.

MERCEDES-BENZ SPRINTER 2500 BLUETEC

- ✦ Weirdly great steering, excellent fit and finish, stable at speed.
- ✦ Rough rider, can't push it past 83 mph.
- An excellent truck, bested by a more excellent truck.



SCHLEP ROCK

We sample (and soil) a few new cargo vans and find that none of them offers CB radios.

We didn't drive three full-size modern vans 430 miles just to gain admittance to the 43rd annual Van Nationals. We also drove them there (with a dorm room's worth of furniture from IKEA) so we'd have a place to sleep away our drunkenness.

Oh, right, and also to perform a comparison test of the newest big boys. After what seemed like a century of incremental improvements to the old-school American vans, our market is now awash with new European-derived big boxes, as well as little-sibling versions. We chose three of the new plus-size van-guard: the Mercedes-Benz Sprinter (now in its second generation here in the U.S.), the new-to-America Ford Transit, and a curious-looking thing called the Ram ProMaster. For the sake of intensified Euro-ness, we chose turbo-diesel engines as the exclusive power source.

This choice effectively knocked Nissan's NV2500 out of our test, since the company offers only gasoline V-6s and V-8s in its big hauler. Chevrolet has dropped its

FORD TRANSIT 150 POWER STROKE

- ✦ Good seating position, strong engine, good brakes, oddly cool styling.
- ✦ Cargo-area windows hamper the ability to get this van a' rockin'.
- ✦ A fully capable truck that drives more like a big car.



We specified windowless cargo versions of each entrant because they seemed somehow more in step with the custom vans we expected to encounter at the Nationals. Also, we weren't running a shuttle service, and we didn't want people looking through the windows at us as we snored. And then the Ford showed up with windows anyway. We chose low-roof models to diminish the commercial-van look (fat chance!), and no dualies or four-wheel-drive or super-extended models were allowed. The idea was to make them, as much as possible, candidates for modern van customizers. Not that any of the vanners seemed to differentiate much between them. But we did.

3. RAM PROMASTER 1500 ECODIESEL

The Ram ProMaster, a Fiat Ducato with ram-head logos, is a detestable, shovel-faced thing that appears to have been cobbled together from spare parts. Too harsh? No, not really. The ProMaster itself is an insult. It is the only vehicle in any comparison test in memory to receive zero points in a subjective category from one of our voters. That would be for its dreadful single-clutch automated-manual transmission. The other voters each gave it one mercy point. Pull out onto a busy road and the vehicle comes to a near stop as the transmission pauses to find the next gear. It's not just annoying, causing your head to bob fore and aft with every shift, it's scary. The steering system is loose and numb and connected to a steering wheel that feels only a few degrees from a horizontal orien-



↑ Above: Vans for the 98-percenters. Left, from top to bottom: The cargo holds of Transit, ProMaster, and Sprinter. Below: Gustav Klimt would have been a helluva van muralist.

light-duty full-size Express van because it was dragging down the company's fuel-economy average. Heavy-duty versions are still available, but the Express was deemed too out of step with the modern vans to include anyway.



VEHICLE	FORD TRANSIT 150 POWER STROKE	MERCEDES- BENZ SPRINTER 2500 BLUETEC	RAM PROMASTER 1500 ECODIESEL
BASE PRICE	\$37,925	\$36,990	\$34,960
PRICE AS TESTED	\$42,180	\$40,571	\$37,590
DIMENSIONS			
LENGTH	237.6 inches	233.3 inches	195.0 inches
WIDTH	81.3 inches	79.7 inches	82.7 inches
HEIGHT	83.2 inches	94.5 inches	90.0 inches
WHEELBASE	147.6 inches	144.3 inches	118.0 inches
FRONT TRACK	68.2 inches	68.0 inches	71.3 inches
REAR TRACK	68.6 inches	68.2 inches	77.6 inches
GROUND CLEARANCE	6.0 inches	7.9 inches	6.9 inches
PASSENGER VOLUME	66 cubic feet	72 cubic feet	70 cubic feet*
CARGO VOLUME	278 cubic feet	319 cubic feet	283 cubic feet
CARGO DIMENSIONS			
DEPTH	139.6 inches	132.3 inches	105.0 inches
MINIMUM WIDTH	54.8 inches	53.1 inches	56.0 inches
LOADING HEIGHT	28.3 inches	28.5 inches	25.6 inches
PAYLOAD			
MAX	3150 pounds	3512 pounds	3740 pounds
AS TESTED	3150 pounds	3512 pounds	3740 pounds
TOWING			
MAX	7500 pounds	5000 pounds	5100 pounds
AS TESTED	4600 pounds	5000 pounds	5100 pounds
POWERTRAIN			
ENGINE	turbocharged DOHC 20-valve diesel inline-5 195 cu in (3198 cc)	sequentially turbocharged DOHC 16-valve diesel inline-4 131 cu in (2143 cc)	turbocharged DOHC 16-valve diesel inline-4 183 cu in (2998 cc)
POWER HP @ RPM	185 @ 3000	161 @ 3800	174 @ 3600
TORQUE LB-FT @ RPM	350 @ 1500	265 @ 1400	295 @ 1400
REDLINE/FUEL CUTOFF	4500/4200 rpm	4200/4200 rpm	N/A / 4200 rpm
LB PER HP	29.8	31.7	28.2
DRIVELINE			
TRANSMISSION	6-speed automatic	7-speed automatic	6-speed automated manual
DRIVEN WHEELS	rear	rear	front
GEAR RATIO:1/	① 4.17/5.9/25	① 4.38/5.2/22	① 4.17/4.5/19
MPH PER 1000 RPM/	② 2.34/10.4/44	② 2.86/8.0/33	② 2.35/7.9/33
MAX MPH	③ 1.52/16.1/68	③ 1.92/11.6/49	③ 1.46/12.7/53
	④ 1.14/21.3/90	④ 1.37/16.1/67	④ 0.96/19.4/79
	⑤ 0.86/28.3/98	⑤ 1.00/22.3/83	⑤ 0.70/26.6/101
	⑥ 0.69/33.6/98	⑥ 0.82/26.9/83	⑥ 0.55/33.5/101
		⑦ 0.73/30.4/83	
AXLE RATIO:1	3.31, limited slip	3.92	4.56
CHASSIS			
SUSPENSION	F: struts, coil springs, anti-roll bar R: rigid axle, leaf springs	F: struts, leaf spring, anti-roll bar R: rigid axle, leaf springs, anti-roll bar	F: struts, coil springs, anti-roll bar R: rigid axle, leaf springs
BRAKES	F: 12.1-inch vented disc R: 12.1-inch disc traction off	F: 11.8-inch vented disc R: 11.7-inch disc partially defeatable	F: 11.8-inch vented disc R: 11.0-inch disc partially defeatable
STABILITY CONTROL	Hankook	Kumho	Continental
TIRES	Dynapro HT LT235/65R-16C 121/119R M+S	Road Venture APT/M LT245/75R-16 120/116S M+S	VancoFourSeason 225/75R-16C 121/120R M+S
C/D TEST RESULTS			
ACCELERATION			
0-30 MPH	3.1 sec	3.4 sec	4.6 sec
0-60 MPH	10.6 sec	11.4 sec	13.4 sec
0-100 MPH	—	—	61.1 sec
1/4-MILE @ MPH	17.9 sec @ 76	18.4 sec @ 73	19.7 sec @ 74
ROLLING START, 5-60 MPH	11.2 sec	12.5 sec	14.6 sec
TOP GEAR, 30-50 MPH	5.0 sec	6.1 sec	6.4 sec
TOP GEAR, 50-70 MPH	7.9 sec	9.0 sec	8.8 sec
TOP SPEED	98 mph (gov ltd)	83 mph (gov ltd)	101 mph (gov ltd)
CHASSIS			
BRAKING, 70-0 MPH	184 feet	193 feet	201 feet
ROADHOLDING			
300-FT-DIA SKIDPAD	0.60 g†	0.61 g†	0.60 g†
WEIGHT			
CURB	5510 pounds	5102 pounds	4902 pounds
%FRONT/%REAR	59.6/40.4	58.1/41.9	65.1/34.9
GVWR	8600 pounds	8550 pounds	8550 pounds
GCWR	10,600 pounds	13,550 pounds	12,500 pounds
FUEL			
TANK	25.0 gallons	26.4 gallons	24.0 gallons
RATING	ULSD	ULSD	ULSD
C/D 900-MILE TRIP	22 mpg	22 mpg	23 mpg
PRACTICAL STOWAGE			
NO. OF 9 X 11 X 16-IN BOXES	235	295	241
LENGTH OF PIPE	191.0 inches	144.0 inches	153.0 inches
LARGEST FLAT PANEL			
LENGTH X WIDTH	138.5 x 53.5 inches	131.5 x 53.0 inches	103.5 x 55.8 inches
SOUND LEVEL			
IDLE	49 dBA	48 dBA	52 dBA
FULL THROTTLE	73 dBA	74 dBA	80 dBA
70-MPH CRUISE	72 dBA	72 dBA	76 dBA

tested in Chelsea, Michigan, by **K.C. COLWELL** and **ERIC TINGWALL**

*C/D estimated. †Stability-control inhibited.



tation. It's better than the steering in an ex-military Hummer H1 or a Mercedes-Benz G-class, but worse than everything else.

Its 3.0-liter inline-four turbo-diesel makes more power than the Mercedes' smaller-displacement four, but the ProMaster returns the slowest acceleration in the test by two seconds to 60 mph. This despite being the shortest and lightest of the vans. It also takes the longest distance to stop from 70 mph. It was the loudest van, it was judged to have the worst ride, and its handling properties were bottom rung.

Oh, and judging by the contorted position that Fiat/Ram forces the ProMaster's driver into, the company must really hate plumbers and delivery drivers. Why? We don't know.

We probably should have specified the longer-wheelbase version, which would have brought it closer to other competitors in terms of length. But the problems that ail the ProMaster will not be solved by more ProMaster.

2. MERCEDES-BENZ SPRINTER 2500 BLUETEC

Despite a substantial rework for the 2014 model year, the Sprinter comes into this comparison test as the grand old man. It was the Sprinter that introduced the new crop of European vans to America, first as a Freightliner-badged model in 2001, then





↑ The ProMaster proved good to lean on. The Sprinter was our mobile living room. But the smooth-driving Transit is this test's winner.

as a Dodge in '03, and finally as a Mercedes in '09. It was something of a revelation when it first came here and remains an excellent vehicle today. Our example, with the smaller of the two available diesel engines, came with an optional bulkhead (\$252) between the cavernous cargo area and the cockpit. It was the only vehicle here fitted with one, so take the interior sound-level readings with a grain of salt. Even without the bulkhead, the Sprinter's seats are a far better place to pass the time than the ProMaster's.

For one, the Sprinter doesn't force its driver and passenger to basically stand up while driving. Its seating position is high, of course, but it's comfortable and the steering wheel is within easy reach. The ergonomics are not nearly as haphazard as those of the Ram, either. And the stereo actually sounds surprisingly decent. It's the steering, though, that really shocks.

Somehow, Mercedes must have accidentally bolted in the steering from a nicely tuned sedan. Strike that—the steering in the Sprinter is actually *better* and offers more feel than virtually any current Mercedes sedan. Does that matter in a cargo van? Yes it does, if you're the one who has to drive it all day.



The 2.1-liter four-cylinder turbo-diesel makes the least amount of power and torque in this test, but with the help of a smooth-shifting seven-speed automatic, the Benz posted a reasonable 11.4-second zero-to-60-mph time. The Sprinter's governed top speed of 83 mph seems like a prudent limit for such a big thing, even if it's lower than the others. But on the open expressway, the Sprinter is stable and comfortable enough to justify more speed. The only real disappointment in the Mercedes is an overly stiff ride, but it doesn't win because it has finally met a tougher competitor.

1. FORD TRANSIT 150 POWER STROKE

We had to talk Ford into providing a diesel-powered Transit. The company preferred to send one with a gas-swilling twin-turbo V-6, which would have clobbered the other

★ FINAL RESULTS

RANK	089			
	1	2	3	
	Maximum points available			
	Mercedes Sprinter			
	Ford Transit			
	Ram ProMaster			
VEHICLE				
DRIVER COMFORT	10	8	8	4
ERGONOMICS	10	9	8	6
CARGO SPACE*	5	3	5	3
TOWING CAPACITY*	5	4	5	5
FEATURES/AMENITIES*	10	10	10	10
FIT AND FINISH	10	8	8	4
INTERIOR STYLING	10	8	7	5
EXTERIOR STYLING	10	7	6	4
REBATES/EXTRAS*	5	0	0	1
AS-TESTED PRICE*	20	18	18	20
SUBTOTAL	95	75	75	62
POWERTRAIN				
1/4-MILE ACCELERATION*	20	20	18	11
FLEXIBILITY*	5	4	2	2
FUEL ECONOMY*	10	9	9	10
ENGINE NVH	10	8	8	5
TRANSMISSION	10	8	8	1
SUBTOTAL	55	49	45	29
CHASSIS				
PERFORMANCE*	20	20	19	18
STEERING FEEL	10	7	9	4
BRAKE FEEL	10	8	8	5
HANDLING	10	8	7	5
RIDE	10	8	6	5
SUBTOTAL	60	51	49	37
EXPERIENCE				
FUN TO DRIVE	25	13	11	7
GRAND TOTAL	235	188	180	135

* These objective scores are calculated from the vehicle's dimensions, capacities, rebates and extras, and/or test results.

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vans with power. Alas, Ford had nothing to worry about. Its 3.2-liter inline-five still produces more power and torque than the others, motivating the Transit to the quickest acceleration times while returning near-identical fuel economy (22 mpg, in mostly highway driving).

And that's for a beast that carries an additional 408 pounds compared with the next-heaviest van, the Sprinter. We deemed its interstellar-cargo-shuttle styling to be our favorite, as were its ride quality and handling. With its easy step-in height, relative immunity to side winds, strong brakes, and generally big-car demeanor, the Transit feels like an extra-large Ford Flex. That's a good thing in our book. We'd still make our sweet custom van out of a '60s Dodge A100, but the Transit surely drives a hell of a lot better. And it certainly carries more beer. ■

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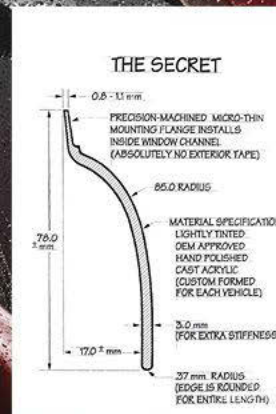
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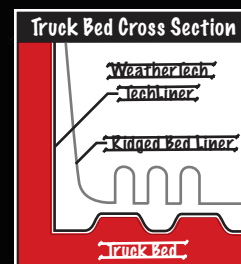
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DIGITALLY



AUDI R8

REMASTERED

THE NEW R8 MIGHT LOOK LIKE A DUPLICATE OF THE OLD CAR, BUT IT'S ACTUALLY A LAMBORGHINI HURACÁN LOADED WITH DIFFERENT SOFTWARE.



HARDWARE MATTERS, but nowadays it's the software that makes the difference. That's true for the smartphones that tech websites tear down to reveal \$40 worth of parts, and it's also increasingly true for cars, even the ones that can't drive themselves around racetracks.

The new Audi R8 is perhaps the greatest example of tuning through ones and zeros. There's no question that the hardware here is superb. The Audi is the Lamborghini Huracán's twin sister, and mechanically the two cars are as closely related as any two of GM's old J-bodies. We'll let you decide which is the Cavalier and which is the Cimarron. Meanwhile, the two cars share the same engine, transaxle, and part-carbon-composite floor and bulkhead. The chassis hardpoints,

by **MIKE DUFF**

steering system, and electronic architecture are also common. Meaning it's the software that gives each car its very different character. The Audi is, as you would expect, dowdier and marginally less exciting. Yet after our time in the R8, we suspect it is destined to have greater appeal.

Buyers of this R8 will have far less choosing to do than before. The V-8 of the original is gone, along with the little-ticked option of the manual transmission and its glorious open-gated shifter. We mourn the passing of both, not the least because it means the base R8 will be considerably more expensive than its predecessor, even if far more powerful. A roadster version is a future certainty, and there's also talk that there eventually will be a smaller turbocharged engine. For now, the choice is between the standard V-10 coupe with 540 horsepower and the 610-hp V-10 Plus, both sharing the same 5.2-liter displacement and heady 8500-rpm redline. There's no official word

on pricing, but we're told that each car will stick close to the market position of its predecessor. So you can be fairly certain that, without at least \$170,000 to spend, there will be no R8 for you.

Value is always a subjective call, but it's hard not to feel shortchanged by the styling, which is familiar to the point of being almost identical. In Darwinian terms, the R8's design has undergone about as much evolution as might happen in a small pond on a single winter's afternoon. The styling is edgier, the borders of the trapezoidal front grille sharper, but from more than 20 yards away it still looks like a face lift rather than a new car.

The chief telltale is that the "side-blades" behind the doors are now divided in two. LED headlights will be standard and, according to Audi USA, we won't be getting anytime soon the snazzy laser lights that will be offered in some markets. Such are the hurdles of getting them through NHTSA certification, in fact, that we might never get them.

The cabin tries harder and works better. The old R8 had started to feel short of both finesse and toys compared with newer

rivals, and this one delivers both smart, functional design and quality materials. Like the new TT (and forthcoming A4), the R8 features Audi's so-called Virtual Cockpit, a configurable video screen behind the steering wheel. This combines instrumentation with everything that would normally be done by a central display screen, and can be switched among a conventional speedometer-and-tachometer combo, a performance readout that includes the seemingly mandatory g-meter, and Google satellite mapping that zooms close enough to let you see if the neighbors sunbathe the topless.





← Allow us this moment to mourn the passing of one of the car world's finest pleasures: the old R8's open-gate manual shifter. The new car is available only with a dual-clutch auto.

The R8's steering wheel now contains most of its dynamic controls. There's a Drive Select button, cycling between comfort and dynamic modes, but there's also a new performance setting—standard on the Plus, optional on the base V-10—that unlocks three additional programs via a steering-wheel button wearing a checkered flag. These are dry, wet, and snow, for those who want to hoon their R8 when it's 10 degrees below.

The other major driving option is ratio-varying Dynamic Steering. This is intended to be sold only in the U.S., and the fact that it was fitted to every single car on the press drive in Portugal suggests that Audi is determined to make us like it.

Despite the almost countless years that Quattro GmbH's engineers put into the new R8, its starring attraction remains the part that has changed the least: the V-10 engine. It's worth the considerable price of admission in its own right; it's a high-revving masterpiece that stands as a glorious anachronism in a world where even Ferrari is downsizing and strapping on turbochargers. As in the Lamborghini, the V-10 has gained both port and direct injection and selective cylinder deactivation, but it is almost unchanged in character.

Revs are what the V-10 does best, but it's no anemic weakling at lower loads. There's enough torque to keep it tractable when asked to trundle, and it's quiet and refined even at the sort of rapid highway-cruising speeds we hope the Portuguese police will indulge a visiting supercar. On the hill roads, it takes a good while to build up to the full allocation of revs. Even changing up at 6500 rpm, it feels sports-car fast, with a

good two grand still to go before reaching the limiter. Cross the 7000-rpm line and you're in definite supercar territory, the V-10 practically popping a can of spinach as it snarls its way to the redline. Under hard use it feels almost as exciting as the Huracán, yet it's equally adept when asked to be a well-mannered boulevard cruiser or a polished autobahn stormer.

The transmission plays a vital part in this Jekyll-and-Hyde trick, with the seven-speed dual-clutch 'box having been tweaked—digitally, of course—to deliver faster and more-forceful upshifts under hard use, along with some nifty rev matching when you change down. Yet, with the gearbox left to its own devices in comfort mode, it's practically a 1970s waft-o-matic, shuffling its ratios both intelligently and seamlessly. The chassis met everything Portugal could throw at it with something close to disdain. The biggest bumps didn't unsettle the car, even with the switchable dampers in their firmest setting. And yet it was also completely unruffled by both the low-quality urban streets we found and some high-speed cruising on the *autoestrada*.

The biggest mechanical change between the first R8 and this one is the arrival of an electronically controlled clutch to divert torque to the front axle, in place of the previous viscous coupling. This is much faster-acting, Audi engineers claiming it can go from fully free to locked in just a tenth of a second. It's set up to divert torque to maximize traction and stability. The result is more adhesion, indeed much more, but far less of the rear-driven feeling the first R8's slower responses gave it, especially at low speed.

Some people earnestly believe that grip, like bacon, is something that you can't have too much of. But at the sort of speeds you're ever likely to see on a public road, the R8 just grabs and goes, the drive-line working all the time to make the experience drama-free. It's blisteringly fast, but definitely not as playful as its sometimes wayward predecessor.

With the generosity that comes from having a PR budget to rival Greece's national debt, Audi had also booked exclusive use of the excellent Autódromo Internacional Algarve near Portimão, a circuit little used for actual racing but able to lay claim to being one of Europe's finest for car testing. Audi inhibits the stability-control switches of its cars on media launches, so we can't regale you with stories of generous doses of opposite lock and inch-perfect





▼ SPECIFICATIONS

VEHICLE TYPE: mid-engine, 4-wheel-drive, 2-passenger, 2-door coupe

BASE PRICE (est) \$170,000–\$190,000

ENGINE TYPE: DOHC 40-valve V-10, aluminum block and heads, port and direct fuel injection

DISPLACEMENT 318 cu in, 5204 cc

POWER 540 or 610 hp @ 8250 rpm

TORQUE 398 or 413 lb-ft @ 6500 rpm

TRANSMISSION: 7-speed dual-clutch automatic with manual shifting mode

DIMENSIONS

WHEELBASE 104.3 in

LENGTH 174.3 in

WIDTH 76.4 in

HEIGHT 48.8 in

CURB WEIGHT 3500–3550 lb

PERFORMANCE (C/D EST)

ZERO TO 60 MPH 3.1–3.4 sec

ZERO TO 100 MPH 7.0–7.4 sec

1/4-MILE 11.3–11.7 sec

TOP SPEED 199–205 mph

FUEL ECONOMY (C/D EST)

EPA CITY/HWY 14/23 mpg

drifting. But the performance mode's most aggressive dry setting allows enough slip to prove that the chassis remains committed to neutrality, even under heavier track loadings. It's possible to make the rear slide under power, but the car will immediately divert torque forward to try and pull itself straight. It's prepared to tighten its line a little more if you ease the throttle mid-corner, as you would in a Mazda MX-5 Miata, but the governing motto is to always keep everything on a tight leash.

The steering dealt with Portugal's roads far better than it did the racetrack at Le Mans, where we drove the car on an insane pre-race parade lap ["Sarthe Bound," September 2015]. There's never much feedback, but the responses are keen and the ratio tweaking is rarely noticeable. That said, we spent most of our time in dynamic mode, which fixes the steering at a fast 13:1 ratio. The steering is accurate and delivers instant response, whichever mode it's in. It's just a shame that it's lost the voluble communication that made the first R8 such a chatty companion.

A final point: Don't automatically assume that the Plus's extra 70 horsepower makes it the one to plow your lottery winnings into. After driving both Plus and standard cars on the road, we really didn't

▼ What is an R8 without the characteristic sideblades behind the doors? Well, a less distinctive supercar, that's what. But if you liked the previous car, you'll dig this one, too.

notice any significant performance advantage from the additional power. The Plus also brings fixed-back-shell sports seats that will be too tight for many, and it has a fixed carbon-fiber rear wing in place of the standard V-10's more subtle pop-up spoiler.

Even knowing how similar the R8 and Huracán are beneath the surface, we don't think that they are natural rivals, which is a clever trick pulled off by their respective engineering teams. The artisanal Lamborghini is the more exciting car, no question. It's harder, angrier, and (we suspect) slightly faster, even though the engine in the Plus R8 is in an identical state of tune. From an outsider's perspective, the fact that the Audi will do pretty much the same for what we're estimating to be a \$60,000 to \$70,000 discount might look like a big problem for Lamborghini's marketing department, but it's probably more concerned by the fact the \$240,745 Huracán has the legs on the \$400,995 Aventador.

The R8 is definitely the better all-arounder, with a far greater range of talents than its Italian sister. It's a viable daily cruiser, as civilized at lower speeds as a TT or an A5 coupe, yet it's also a thrilling road lion in its own right. One with an engine that, somewhere in the electron-driven future that awaits us all, we will likely look back upon as one of the all-time greats. Mostly new yet so quintessentially unchanged, the R8 remains an everyday, year-round exotic. ■





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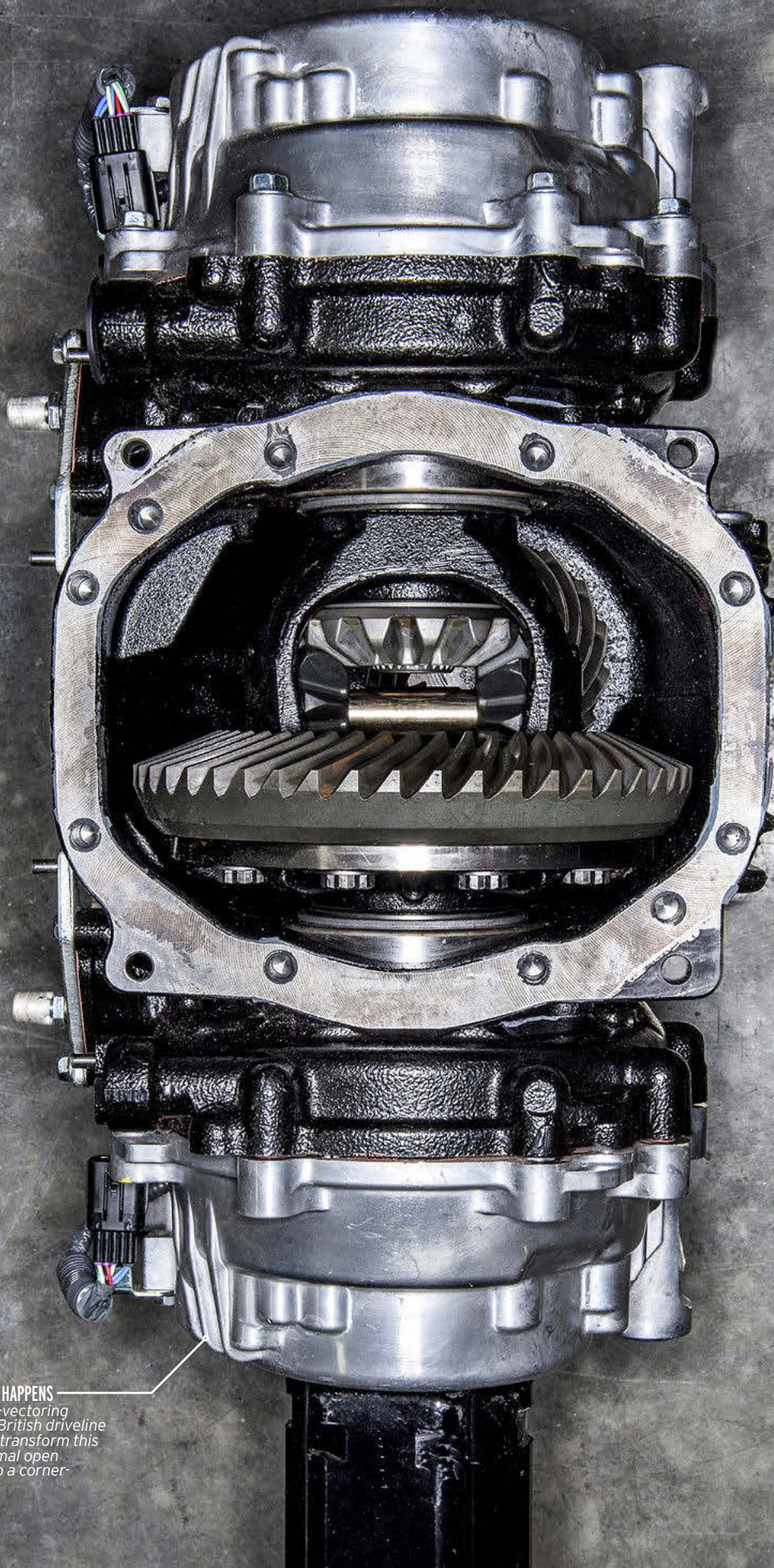
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differential to the test.*

WHAT'S THE DIFF?

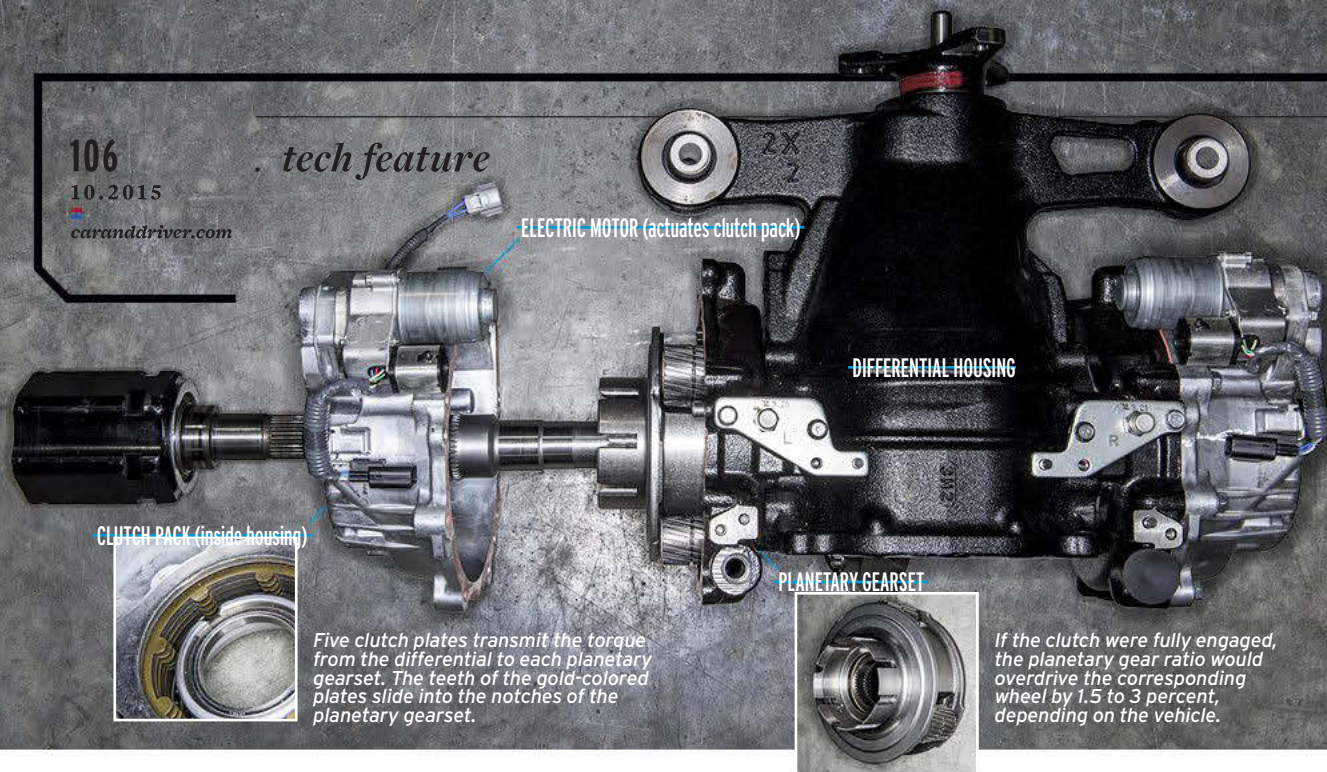
THE JAPANESE SAY TORQUE VECTORING REDUCES STEERING EFFORT. THE GERMANS WILL TELL YOU that these trick differentials increase dynamism (whatever that means). And the Americans—just now getting started with the upcoming Ford Focus RS—claim it provides for “unmatched agility.” We’ve quaffed the cherry Kool-Aid ourselves, praising the technology when we’ve driven cars equipped with it, so it appears that everyone is in agreement: The ability to apportion torque between a car’s right and left drive wheels does supernatural things for vehicle dynamics.

Yet when we pressed for the hard evidence, no one in the industry could provide data showing that a torque-vectoring differential measurably improves performance. To venture beyond manufacturer claims, we slapped our instruments on two cars—one with a torque-vectoring differential, one without—to collect our own data.

Like all differentials, the torque-vectoring unit’s first responsibility is to reconcile speed differences between the drive wheels. As a car rounds a corner, its tires trace four distinct arcs with four different radii, so each wheel turns at a different speed. Whether it’s an open, a limited-slip, or a torque-vectoring example, a differential allows any wheel that’s connected to the powertrain to rotate independently.

BY ERIC TINGWALL
PHOTOGRAPHY BY ROBERT KERIAN

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Torque-vectoring differentials are capable of much more, though. Controlled by sophisticated electronics and fitted with complex gearboxes, these high-tech diffs are placed on the drive axle to regulate thrust between the left and right wheels. With unequal torque between the two sides, the resulting yaw moment (torque about a vertical axis) either encourages turn-in or stabilizes and straightens the car, depending on how the torque is distributed. In theory, torque vectoring helps a car corner with reduced steering lock and less understeer. Those attributes should translate to a more controllable car, higher speeds in corners, and faster lap times.

We should note the distinction between the differentials we're discussing here and brake-based torque vectoring, the dollar-store variety that's increasingly found on economy cars and crossovers. Brake-based systems selectively squeeze individual brake calipers to slow the inside wheels and increase torque to the outside wheels in turns. Automakers use this setup because it's lighter and cheaper than ponying up for the more complex hardware while still creating a useful yaw moment. But it doesn't

take a race engineer to recognize the paradox in using the brakes to go faster.

Proper go-fast torque vectoring requires at least one overdrive gear in the differential (though often there are two) capable of spinning the wheels faster than if they were driven through a conventional diff.

When the computers decide to divvy up the torque, clutch packs connect the overdrive gears to the differential output, varying the clamping force to adjust thrust between the left and right wheels. Because the clutches don't fully engage, the outside wheel doesn't actually spin faster. Instead, the partially meshed overdrive gears provide a push, like paddling harder—not faster—on one side of a canoe.

Torque vectoring came to production cars via rally-bred racers such as the Mitsubishi Evo, but today it's most commonly found in expensive, overfed, four-wheel-drive vehicles with a performance pretense. The torque-vectoring differential is why the massive BMW X5 M and X6 M are more ridiculously entertaining than they have any right to be. Audi's Sport Differential helps the nose-heavy, four-wheel-drive S4, S5, and S6 turn in like rear-drivers.

Automakers insist that torque vectoring will always be a niche offering, but as the technology has matured, it's found its way into more diverse applications such as the four-wheel-drive Nissan Juke and the aforementioned Focus RS. When the 467-hp Lexus RC F launched last year, it was the first front-engine, rear-drive production vehicle to offer torque vectoring. At more than 4000 pounds, though, the RC F weighs as much as some four-wheel-drive cars.

The torque-vectoring differential, cleverly called TVD by Lexus, is optional on the RC F, while a Torsen limited-slip differential comes standard. That makes the RC F the perfect test bed for our examination.

Save for their differentials, our RC F test cars were nearly identical. Both have the same 5.0-liter V-8 and eight-speed automatic, Michelin Pilot Super Sport tires, and matching Ultrasonic Blue Mica 2.0 paint. There is one asterisk in this test: The RC F with the standard limited slip has a sunroof that the torque-vectoring car lacks.

There are tradeoffs to choosing the fancy diff. The TVD weighs 67 pounds more than the standard Torsen limited slip, and it's not cheap. Lexus sells it as a \$1750

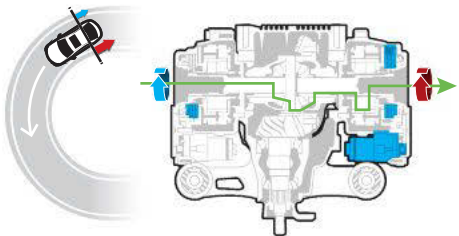


C/D TEST RESULTS

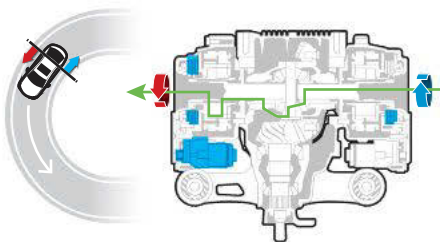
	LEXUS RC F WITH TORSEN LIMITED SLIP	LEXUS RC F WITH TORQUE VECTORING
WEIGHT		
CURB	4016 pounds	4057 pounds
%FRONT/%REAR	54.4/45.6	53.5/46.5
CG HEIGHT	20.0 inches	19.5 inches
300-FT SKIDPAD		
ROADHOLDING	0.91 g	0.94 g
AVERAGE STEERING ANGLE	135 degrees	99 degrees
AVERAGE DRIFT ANGLE	0.6 degree	2.3 degrees
610-FT SLALOM		
AVERAGE SPEED	42.2 mph	42.7 mph
1.7-MI ROAD COURSE		
LAP TIME	1:19.1	1:18.7

How Torque Vectoring Works

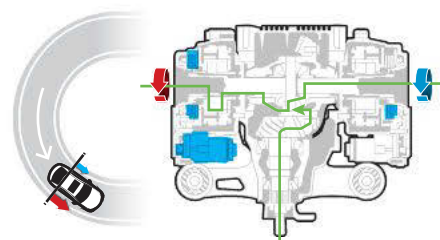
Torque vectoring, as the name implies, uses engine output to vector, or direct, the car. A clutch pack engages a planetary gearset to increase the torque to the adjacent wheel while simultaneously diminishing the torque at the opposite wheel. This difference can be great enough to create forces at the tires that act in opposite directions, turning the car.



ENTERING A TURN During deceleration, the inboard clutch engages the gearset to transfer torque from the outside wheel to the inside wheel, tightening the car's line.



MORE YAW To increase the car's turn rate, the inboard clutch opens and the outboard clutch closes. Torque at the outside wheel rises so that the forces at the tires act in opposite directions and increase yaw, even though both wheels spin in the same direction.



EXITING UNDER POWER Under acceleration, the overdrive gear directs more thrust to the outside wheel, resulting in about a 70/30 split.

option and requires that buyers take either the \$4400 Premium package or the \$5500 Performance package with the TVD.

To determine if torque vectoring is worth the cost and weight penalties, we ran the RC Fs through three tests: a 300-foot skidpad, our 610-foot unequally spaced line of slalom cones, and laps around the road course at Chrysler's Chelsea Proving Grounds. We recorded data with RaceLogic's most advanced VBOX, using a two-antenna GPS system tied into an inertial measurement unit. We also pulled information such as steering-wheel angle from the cars' CAN (controller area network) buses.

The torque-vectoring differential built a convincing case from the beginning. On the skidpad, the standard RC F loses cornering grip at its front tires first, while the TVD-equipped car circles with restrained but consistent oversteer. By holding understeer at bay, the torque-vectoring car achieved lateral grip of 0.94 g, an improvement of 0.03 g on the Torsen-equipped car. At the same time, the TVD reduced the average steering angle from 135 degrees to 99. That's the difference between awkwardly crossing your wheel-gripping lower hand over your chest or holding it comfortably at the six-o'clock position.

Lexus provides three settings for the TVD—normal, slalom, and track—selected independently of the car's drive mode. Naturally, we started with the middle setting for our accelerating-then-slows slalom, but soon discovered that slalom should instead be called "hooligan." As fun as it is to pivot around the cones, exiting the gates sideways isn't the quickest way through the course. Our fastest run, 0.5 mph quicker than the Torsen-equipped car, was achieved in track mode, which dials in more stability at higher speeds.

We used the track setting for the road course as well, where the TVD car beat the Torsen car by 0.4 second with a 1:18.7 lap around the 1.7-mile track. The RC F with the conventional limited-slip diff entered corners with pressing understeer, but in several turns made an abrupt, midcorner transition to oversteer. That kind of high-maintenance behavior makes the car unwieldy and more unpredictable than fun. With the TVD, the car's attitude remains consistent throughout the corner. From turn-in to track-out, the TVD minimizes the effort required to hold the line.

There's no question that torque vectoring improves objective performance, yet the strongest selling point for this differential is how the car feels from behind the wheel. Whether it's at the limit on the track or winding down country roads, torque vectoring makes the car livelier and more controllable. Without it, limit cornering is a trying exercise in traction management, load transfer, and other subtle variables. The torque-vectoring differential feels like a subtle push from behind. Turn the wheel and the car dives in so eagerly and effortlessly that you'll want to attribute its behavior to magnetic forces or supernatural powers. Or, you might just tell passengers that it's all due to your peerless driving technique. And isn't that worth the money? ■

SMASHING PUMPKINS

Differentials deciphered.

OPEN DIFFERENTIAL

WHAT IT DOES

Splits engine torque into two outputs, each of which is able to rotate at a different speed.

SHORTCOMINGS

When one tire loses traction, the opposing tire also experiences a torque reduction. In the worst case, your car is stuck with one wheel freely spinning while the tire with better traction can't deliver enough torque to budge the vehicle.

Modern traction-control systems compensate by applying the brakes (and thus a reaction torque) to the slipping wheel. That said, a more sophisticated diff is generally quicker-acting and more effective than this type.

FOUND IN

Anything without the pretense of performance or off-road ability—family sedans, crossovers, minivans, economy cars, etc.

LOCKING DIFFERENTIAL

WHAT IT DOES

With the diff locked, the connected wheels always spin at equal speeds. In sand, mud, and snow, a locked differential ensures that torque continues to flow to the wheel with higher traction.

SHORTCOMINGS

Behaves like an open differential when not locked. Locking the diff on a high-grip surface such as dry pavement makes it difficult to turn the vehicle and can grenade the driveline.

FOUND IN

Jeep Wrangler, Mercedes-Benz G-class, Ram 2500 Power Wagon; optional on most full-size trucks.

LIMITED-SLIP DIFFERENTIAL

WHAT IT DOES

A limited-slip differential marries the concepts of open and locked diffs, working like an open differential the majority of the time, then automatically

beginning to lock as slip occurs. Lock-up can be achieved via a viscous fluid, a clutch pack, or a complex geartrain.

SHORTCOMINGS

Purely mechanical limited-slip diffs are reactive. That is, they don't begin to lock up until after wheelslip has occurred.

FOUND IN

Nissan 370Z with Sport package (viscous), Mazda MX-5 Miata (clutch type), Scion FR-S/Subaru BRZ (helical gears).

ELECTRONICALLY CONTROLLED LIMITED-SLIP DIFFERENTIAL

WHAT IT DOES

An electronically controlled clutch pack offers rheostatlike control between open and fully locked behaviors, with adjustments made hundreds of times per second. For example, if the computer determines there's too much oversteer during cornering, it can dial in more lockup to stabilize the car.

SHORTCOMINGS

As with a conventional limited-slip diff, torque is biased toward the slower wheel.

FOUND IN

BMW M3 and M4, Cadillac ATS-V and CTS-V, Chevrolet Corvette with Z51 package, Ferrari 488GTB.

TORQUE-VECTORING DIFFERENTIAL

WHAT IT DOES

Using additional geartrains to overdrive the half-shafts, torque-vectoring differentials fine-tune the torque delivered to each drive wheel. This produces a yaw moment that can slow or quicken the car's rotation in a corner. Still confused? Read the damn story.

SHORTCOMINGS

Torque-vectoring differentials are heavy, complex, and expensive, and inflict a slight fuel-economy penalty.

FOUND IN

Audi S4, S5, and S6; BMW X5 M and X6 M; Lexus RC F.

MERCEDES-BENZ GLC-CLASS / DODGE VIPER ACR

• CONVERTIBLE

PORSCHE BOXSTER SPYDER

Zuffenhausen adds beef to its open-top treat.
by Davey G. Johnson

Ever since the Boxster launched 19 years ago, wags have derided Porsche for not fitting its mid-engined car with a 911-grade powerplant, suggesting that the company is afraid to one-up the 52-year-old centerpiece of its lineup. Even Zuffenhausen's most starry-eyed apologists have lamented the policy time and again. And it's worth noting that while the House of Ferry uses the 550 Spyder to tout the Boxster/Cayman's heritage, the James Dean Deathwagen and its successors—718 RSK, 718 RS 60, 718 W-RS, and so on—were high-performance racing machines representing supreme Porsche performance.

The rear-engined 356 was the car for the sporting masses.

In contrast, the Boxster has spent its career cast in a supporting role, relegated to the same ignominious fate as the 914. Sure, you could buy the 914, a mid-engined Volkswagen collaboration, with a six-cylinder in the early '70s, but that six was the 1969 model year's bottom-feeding 911T motor, while the 911T itself received a power bump. The 911 has always been on top. With the \$83,095 Boxster Spyder, Porsche promises amends, having finally stuffed behind the convertible's seats the 3.8-liter flat-six from the 911 Carrera S.



↑ The fussy top hides under a bulbous aluminum tonneau. A big-engined Boxster with a regular top would be better.

Yet the engine is still not as powerful as it is in the Carrera S, Porsche blaming the shorter intake manifold required to make the engine fit this layout for cutting output from 400 horsepower to 375. As one Porsche engineer said to us in a seeming attempt to absolve Weissach of any responsibility for the Boxster's power cut: "It detunes itself!" Sure.

Compared with the \$85,595 Cayman GT4, which shares its engine with the Spyder but has 10 more horsepower, the Boxster is not quite as track oriented. Whereas the GT4 receives the 911 GT3's front suspension minus the center-lock wheels, the Spyder is, essentially, a Boxster GTS with extra displacement, foofy



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▼ SPECIFICATIONS

VEHICLE TYPE:	mid-engine, rear-wheel-drive, 2-passenger, 2-door convertible
BASE PRICE	\$83,095
ENGINE TYPE:	DOHC 24-valve flat-6, aluminum block and heads, direct fuel injection
DISPLACEMENT	232 cu in, 3800 cc
POWER	375 hp @ 6700 rpm
TORQUE	310 lb-ft @ 4750 rpm
TRANSMISSION:	6-speed manual
DIMENSIONS	
WHEELBASE	97.4 in
LENGTH	173.8 in
WIDTH	70.9 in
HEIGHT	49.7 in
CARGO VOLUME	10 cu ft
CURB WEIGHT	3000 lb
PERFORMANCE (C/D EST)	
ZERO TO 60 MPH	3.7 sec
ZERO TO 100 MPH	8.6 sec
1/4-MILE	12.2 sec
TOP SPEED	180 mph
FUEL ECONOMY	
EPA CITY/HWY	18/24 mpg

bodywork, nylon-strap interior door pulls, and \$7500 added to the price.

The last iteration of the Boxster Spyder featured a fussy, skeletal flibbertigibbet of a roof. The new car's top is simpler, although it retains a measure of fiddliness, courtesy of maddening hidden buttons that release the canvas buttresses from their moorings. It requires that the power latch be operated by a console-mounted switch, which somewhat undermines the purity of the otherwise-manual unit. We can't help thinking that Porsche would've done better to ape the honest, magical simplicity of the Mazda Miata's manual roof.

When stowed, the top is masked by a large, be-cowled aluminum tonneau. The revised decklid visually thickens the Boxster's excellent lines, leaving the car's appearance exceptionally color-dependent. In Racing Yellow, the effect works. In silver, the Spyder resembles a stuffy, slab-sided ingot. In Guards Red, the vibe gets a little regrettable. As in, "*Ach! Fancy Jurgen took his Boxster to ze Pep Jungen!*" Because the Spyder trades the GT4's sizable wing for a stunted ducktail, the front splitter has been shortened slightly to maintain an equitable distribution of downforce.

The tight Italian roads where we

↑ We prefer the styling, top mechanism, and interior door levers of the Boxster GTS, but the Spyder's additional 45 horsepower is nice.

flogged the car make one aware of the sheer size of the Boxster. Its stout exhaust note, with programmed-in overrun violence, merely adds to the beefcake gestalt. This Spyder is no light-and-lithe tool; it's more godly hammer than asphalt scalpel. It does, however, remain wholly unperturbed by pavement imperfections, and the newfound power does nothing to make it twitchier. While the base 2.7-liter Boxster is a momentum-oriented machine that demands attention and revs to stay on the pace, the Spyder steamrolls all manner of speed-killing sins with a liberal application of the right foot. On a tight road, choose the appropriate gear via the sebaceous six-speed manual gearbox (the only available transmission) and drive it as you would a one-speed Tesla. When more than engine braking is required, the middle pedal offers plenty of stopping power. Carbon-ceramic brakes are an option for those who simply must have the yellow calipers.

In some ways, the Spyder feels like a Johnny-come-lately answer to Ferrari's 355, a contemporary of the original Boxster. It's a ripped, rip-roaring muscle

machine with an aural fury to match its unerring point-and-squirt dynamics. As if to underscore this, Porsche's prescribed drive route took us through Modenese countryside. Tossing Swabian grind, blat, and pop at the ancient stone walls and reveling in the echoes felt like sacrilege of the finest order. And, with such a tall

second gear, there was plenty of Teutonic sonic bombast to send ricocheting through towns and into the hills as we wound the Spyder up close to its 7800-rpm redline.

The traction and stability governoriness allow a sensible modicum of loose-booty playfulness while keeping the car fundamentally headed toward the next apex. A versatile, predictable bruiser of a thing, this Porsche is. Come up behind a hydrocarbon-belching Autobianchi caroming through the curves, find a spot wide enough to pass, and depress the accelerator with prejudice. *Arrivederci, hairhat!*

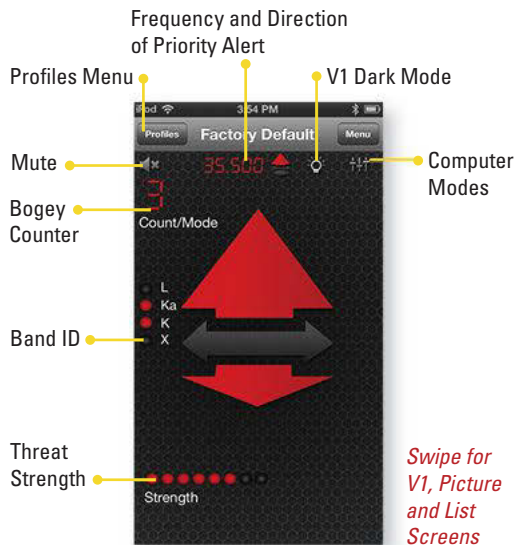
Colin Chapman acolytes may brand us heretics, but in a car as thoroughly modern as the 981-gen Boxster, the 24-pound weight savings engendered by the Spyder's overly complex top doesn't seem worth the effort expended to engineer it, especially when the standard powered unit is such a joy to use and results in a prettier package. Instead, the treatment merely burdens a fundamentally excellent vehicle with unnecessary complications. Driving the Spyder, we realized that what we'd really like is a Boxster GTS 3.8, power roof and all. Before the naturally aspirated flat-six goes the way of the lesser bilby, might you please build us one of those, Porsche?

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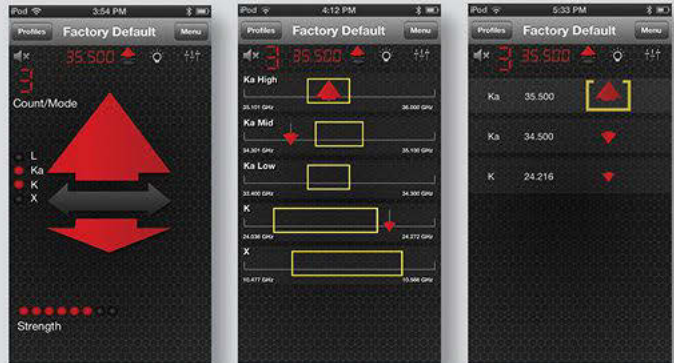
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Mike Valentine
Radar Fanatic



MERCEDES-BENZ GLC-CLASS

Luxury-crossover buyers, prepare to be excited.

by Erik Johnson

A new crossover gets us nearly as excited as the prospect of binge-watching C-SPAN. Or maybe binge-watching people who are binge-watching C-SPAN. Yet such vehicles are wildly popular, and so every automaker offers at least as many variations on the theme as there are variations of, well, C-SPAN. This includes Mercedes-Benz, which is rebooting its compact-luxury entry with the new GLC-class.

The rear- or four-wheel-drive GLC replaces the GLK-class, the rebadge align-

ing it with the mechanically similar C-class sedan. Compared with the blocky GLK, the more curvaceous GLC is fractionally taller, two inches wider, and nearly five inches longer overall.

We drove the new crossover in Switzerland—more commonly known as the Alsace region—in both GLC250 and GLC250d guises. We won't get the former, as Benz is sending the U.S. the GLC300, which uses the 250's same 2.0-liter turbo four but with 30 more horsepower for a total of 241. And that's good, since the GLC250 feels underpowered by exactly that much.

The GLC250d diesel will arrive here late next year with a GLC300 badge. The diesel makes 201 horsepower and a robust 369 pound-feet of

← We liked the little GLK, apparently more than shoppers did. This larger, nicer GLC should prove to be more popular with most buyers.



▼ SPECIFICATIONS

VEHICLE TYPE: front-engine, rear- or 4-wheel-drive, 5-passenger, 4-door hatchback
BASE PRICE \$39,875-\$41,875
ENGINE TYPE: turbocharged and intercooled DOHC 16-valve inline-4, aluminum block and head, direct fuel injection
DISPLACEMENT 121 cu in, 1991 cc
POWER 241 hp @ 5500 rpm
TORQUE 273 lb-ft @ 1300 rpm
TRANSMISSION: 9-speed automatic with manual shifting mode
DIMENSIONS
WHEELBASE 113.1 in
LENGTH 183.3 in
WIDTH 74.4 in
HEIGHT 64.5 in
CURB WEIGHT 4000-4150 lb
PERFORMANCE (C/D EST)
ZERO TO 60 MPH 6.3-6.4 sec
ZERO TO 100 MPH 16.0-16.2 sec
1/4-MILE 15.9-16.1 sec
TOP SPEED 130 mph
FUEL ECONOMY (C/D EST)
EPA CITY/HWY 20-21/26-28 mpg

torque. Both engines are smooth and refined, although throttle response is lazy in the Mercedes way, and their power delivery can best be described as “oozing.” Both of these GLCs, as well as their future American analogues, use Mercedes’ brand-new nine-speed automatic. It’s mostly invisible, although it did deliver a few harsh shifts in sport-plus mode when we matted the throttle out of tight bends.

Predictably, the GLC drives like a C-class on stilts. The steering provides a confident sense of straight-ahead, and effort builds predictably when you turn the wheel. The optional Airmatic suspension offers good body control, and its modes are clearly delineated in terms of road feel, but as in the C-class, the sport-plus program is quite firm. This wasn’t an issue on Europe’s smooth roads, but it will be problematic on gnarlier U.S. pavement.

A spitting image of the C-class cabin, the GLC’s interior is a cut above anything else in the segment, and the materials, detailing, and finish all put the old GLK’s cockpit to shame. The seats are comfortable, and the interior is hushed even at autobahn speeds. So it’s surprising that the GLC300 will start at \$39,875, just \$1050 more than last year’s GLK, while adding a pile of standard luxury and safety gadgets. No full-bore, Mercedes-AMG GLC63 is in the plans, but a 362-hp GLC450 AMG Sport arrives next summer.

The GLC isn’t as polarizing as the GLK, and it’s a huge advance in terms of desirability and both real and perceived quality. We might not be excited, but luxury-crossover buyers should be.

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DODGE VIPER ACR

The Viper, on a wing and a prayer. *by Tony Quiroga*

To make a Viper go faster, Dodge feels it has to make it slower. Wait... what?

The Viper ACR is the fastest Viper around a racetrack—at least, that's Dodge's claim—but a 177-mph top speed technically makes it the slowest Viper sold. With the exception of a finned differential housing, the ACR's drivetrain is identical to the rest of the Viper lineup's. An 8.4-liter V-10 that looks to be about the size of a steamer trunk snores out 645 horsepower and 600 pound-feet of torque. What makes the Viper ACR faster around a race-track—downforce—is also what reduces its straight-line speed.

Aerodynamic downforce from a wing or properly shaped exterior panels presses a vehicle into closer contact with the ground. In a car on a tight track, this is a good thing. The harder the air pushes the car into the tarmac, the higher the grip and the faster a car can corner. But downforce also creates drag.

At top speed, the ACR's total downforce is 1533 pounds. To achieve that figure, a huge adjustable wing bolts to the rear end, a massive front splitter gives the car an underbite, the front bumper wears a dive-plane mustache, vents in the front fenders relieve pressure, and a rear diffuser juliennes the air like a Ginsu. Opt for the \$6000 ACR Extreme Aero pack-

▼ SPECIFICATIONS

VEHICLE TYPE: front-engine, rear-drive, 2-passenger, 2-door hatchback

BASE PRICE \$122,490

ENGINE TYPE: pushrod 20-valve V-10, aluminum block and heads, port fuel injection

DISPLACEMENT 512 cu in, 8382 cc

POWER 645 hp @ 6200 rpm

TORQUE 600 lb-ft @ 5000 rpm

TRANSMISSION: 6-speed manual

DIMENSIONS

WHEELBASE 98.8 in

LENGTH 175.7 in

WIDTH 76.4 in

HEIGHT 49.1 in

PASSENGER VOLUME 48 cu ft

CARGO VOLUME 15 cu ft

CURB WEIGHT 3400 lb

PERFORMANCE (C/D EST)

ZERO TO 60 MPH 3.2 sec

ZERO TO 100 MPH 7.7 sec

1/4-MILE 11.6 sec

TOP SPEED 177 mph

FUEL ECONOMY

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age and the wing, splitter, and diffuser are larger, making them even more effective, and resulting in more than 1700 pounds of downforce at top speed. They



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push the ACR deeper into the asphalt, but jack up the drag coefficient to roughly that of the Pan Am building. According to the Dodge folk, the ACR Extreme Aero has a 0.54 drag coefficient versus the

↑ It's road legal, but the ACR's near-slick tires, super-stiff suspension, and Extreme Aero add-ons mean it's not at all road sensible.

base Viper's 0.37 and the TA's 0.43.

We drove the Viper ACR Extreme at Virginia International Raceway a month after our Lightning Lap test, which is why you're reading about it here and not on

page 044. We didn't get to time our laps or record any performance measurements, but we're confident that the ACR is several seconds quicker around VIR's 4.1-mile-long course than the Viper TA we tested there last year, which ran a 2:49.9.

Although the aero package is a major part of the ACR, other upgrades are baked into the \$122,490 base price, which is \$9900 above the midline GTS trim. Carbon-ceramic front brakes that measure 15.4 inches (1.4 inches larger than the regular Viper's) with six-piston calipers necessitated 19-inch front wheels. Behind the 19-inch rear wheels are 14.2-inch carbon-ceramic rotors with four-piston calipers.

To make the most of the downforce and braking power, the ACR has a new tire engineered specifically for it by Kumho. Following two years of development, Kumho came up with the Ecsta V720, a near-slick with a few superficial depressions molded in to qualify it as a DOT-approved street-legal tire. The rear tire size is the standard Viper 355/30R-19, and the fronts have the same 295 width as other Vipers, though the front wheel is an inch taller and half an inch wider.

Squeezed between the tires and the body are radically stiffer springs with height-adjustable perches and adjustable coil-over shocks that can be tuned in both jounce and rebound directions. To offset the 70-pound weight gain of the Extreme Aero package, the ACR gets a lightweight battery, loses trunk carpet and sound-



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deadening materials, and ditches most of the audio system's speakers.

The ACR feels very stable at VIR and isn't prone to take spastic leaps off the curbs, proving easier to drive fast than the TA we lapped last year. For one thing, it doesn't react to every steering-wheel movement with the jerk of a leg that's been hit in the knee with a rubber mallet. The ACR is a bit slow on turn-in, possibly too slow.

To demonstrate the ACR's adjustability and to liven up the turn-in, Dodge engineers dialed back the rear wing and removed the front-fender louvers. We didn't run many laps with this setup, but the car did gain some front-end grip. We could turn in with more determination, and we had grip to spare in VIR's many long, sweeping corners.

On the long straight, the winged ACR hit an indicated 147 mph going into the braking zone. Last year in the wingless Viper TA, we saw 152.1 mph there. With less speed on the straight, the ACR's grippier tires and huge brakes allowed us to slow later and with greater confidence. We did notice that the nose would dive enough to plow the front splitter into the track when braking hard into one of the uphill sections. But don't be afraid of the ACR's prodigious stopping power: The splitter can be easily replaced.

And don't get the idea that the ACR is an easy machine to drive quickly. It's definitely worthy of the name Viper. Unless you're a veteran track rat, it takes a lot of laps to get used to the ACR's grip. It wants to be pointed straight when you're hard on the brakes or the tail will wag; the shifter still needs to be strong-armed into gear; and making meaningful downforce requires big speed, and here this means bolting headlong into VIR's most pucker-intensive corners. But it's only the speed that's daunting; the car's behavior is predictable—as long as you don't do anything stupid.

Dodge is once again selling a race Viper on which you can mount a license plate. Even though it's street legal, we can't tell you what the Viper ACR is like to drive on the road. Dodge restricted our ACR driving to the track, a clear indication of this car's mission. Driving it among hatchbacks and crossovers will be frustrating, because going slow on a track is still better than trying to go fast on the street. Much like the "slower" ACR is more fun than the "faster" Vipers. ■



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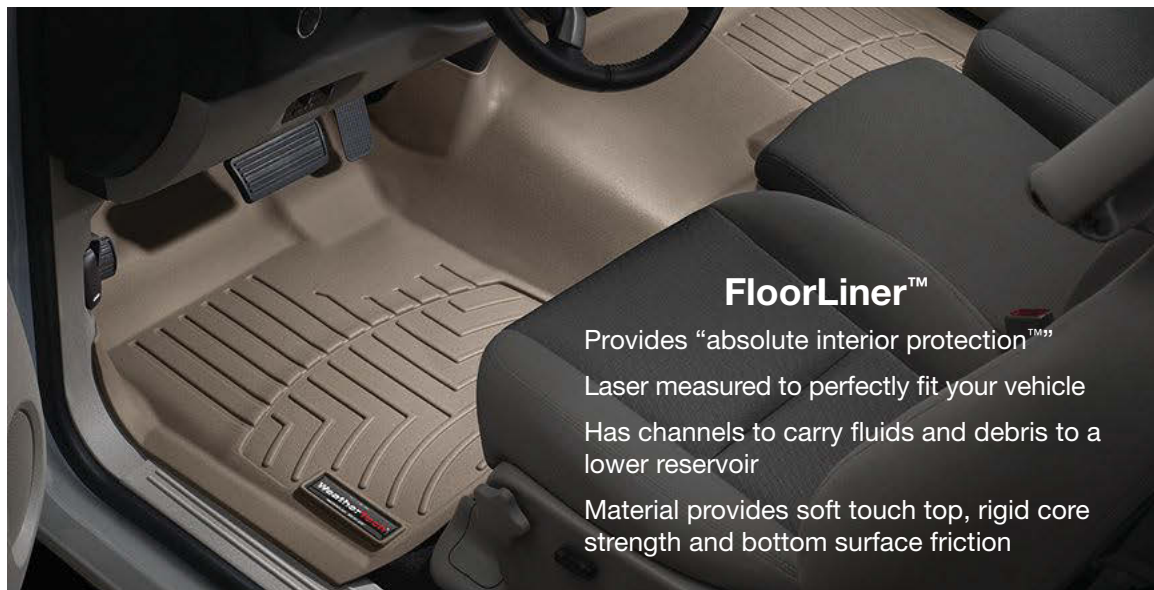
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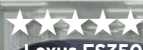
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BRAD PAISLEY

Brad Paisley, 42, has won three Grammys and dozens of country music awards. His latest album is called Moonshine in the Trunk. That's our kind of album title.

C/D: Your tour bus is painted like a 1958–62 Corvette.

BP: I have a lot of things painted like that, with the Corvette cove. My guitar room at the studio is an entire room painted red with a giant 12-foot Corvette cove where the guitars hang. You'd love it. That might be the most attractive and iconic design for a vehicle ever. There's no doubt what that is when you see it.

C/D: And you're buddies with NASCAR team owner and mega-dealer Rick Hendrick?

BP: He's generous and giving, and he doesn't allow me to just get a car without getting his people to fix it up. I've got a ZR1 from 2011 that he went nuts on. Jimmie Johnson's team brought it into their shop and got it up to 770 [horsepower] or so at the flywheel.

C/D: Many of your songs and albums have car-related titles.

BP: Including the latest one. In the interview request, you mentioned "All I Wanted Was a Car," which is a really obscure album cut. I've always loved that song and the idea that, in our culture, the car is a catalyst for so many things. The car is almost clothing in America—especially in Middle America—in a way that it isn't in other countries. I'm such an oddball that when I meet people I'll say, "What do you drive?"

C/D: What was your first car?

BP: I'm the son of the son of a Pontiac salesman. My dad, working for his dad, was a Pontiac guy. And I was raised that way so that by the time I could get a car, I didn't just want something that would roll. The first one for me was a Chevy Cavalier.

C/D: Ewww!

BP: But it was great because it was \$2000, and I saved up to get it because I played a lot of music in my home area. Christmastime was always a bunch of solo acoustic gigs, and they'd pay you \$200 or \$300 for a couple hours to stand there and sing. My next car, the car I drove to Nashville, was a Pontiac Firebird.

C/D: Your dad is still into cars?

BP: It's a terrible business model, because what happens is that I'll get a Corvette and drive it for a few years and then they come out with some new model. So I'll decide to sell the old one and he'll say: "Hey, I've wanted to talk to you about that. I've grown kind of attached to that car. I'd like to buy it from you." I'm not going to sell my dad a car, after he put me through college. So he has three Corvettes because he's told me he's attached to them. When your father says he loves a car, you give it to him.

C/D: What's the greatest driving song of all time?

BP: I would say "East Bound and Down" [by Jerry Reed, from the *Smokey and the Bandit* soundtrack]. You can't listen to that and not go a little faster.

C/D: A lot of guitar players are into cars.

BP: There's a reason Fender started painting Stratocasters Fiesta Red back in the '50s and '60s. And there's a reason why they're shaped the way they're shaped. I like to play fast, and



I like to play loud. It's the same thing as a muscle car.

C/D: Have you ever run from the cops, as in "Mr. Policeman"?

BP: Yeah, I did. In college I was going too fast on a big, curvy mountain road that goes to West Liberty University in West Virginia, and I crested one of the hills and I got air. And in the left lane was a car and I could see its police lights. The speed limit was like 45, and I was going probably 80. Immediately his brake lights came on and he was turning around. I could slow down and wait for the inevitable arrest or I could keep going. I kept going as fast as I could. Right before a 90-degree turn I slammed on the brakes, pulled into a driveway, and turned the lights off. Sure enough, 30 seconds later, the sky lights up and it's the police car with sirens blaring. And he goes right by. After a few cars went by, I fired up my car and pulled out. Sure enough as I drove by he had pulled someone else over. Whatever the next car was.

C/D: Is there anything you'd do differently?

BP: I wouldn't have tried to pull out onto Nolensville Pike in Nashville one night at midnight in the rain. That's how my Firebird was totaled, hit by a black van whose lights weren't on. I didn't know I was hit until I was spinning. I would go back and say, "Don't turn out of there." —JOHN PEARLEY HUFFMAN

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A WORK BOOT THAT WEARS LIKE A COFFEE BREAK.



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